VISUAL FUNCTION IN FIFTY-EIGHT INTELLECTUALLY HANDICAPPED CHILDREN

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Abstract

Fifty-eight children from opportunity class type "A" were screened. The aim was to evaluate the type and incidence of ocular defects in these children. The results revealed that 50% of the children had significant ocular defects, which is a higher incidence of defects than is found in the average school population.

Key words: *Intellectually handicapped children, Wisc-R test, vision dependent subtests, Guy's colour plates.*

INTRODUCTION

A screening programme was undertaken in four public schools in the northern metropolitan area of Sydney to determine the incidence and type of ocular defects found in intellectually handicapped children. Fifty-eight children classified as "OA" that is Opportunity Class Type A were examined.

To obtain a position in an OA class a child must satisfy one or more of the following three criteria:

1. that his intelligent quotient determined by the Wechsler Intelligence Scale for Children — Revised, also referred to as the WISC-R, is within the range 70 to 90
2. that he has an obvious or specific difficulty in reading or writing
3. that he has an obvious emotional or social problem.

The WISC-R test assesses a child's intellectual ability on Verbal and Performance Scales and is comprised of the following 12 subtests: Information, Similarities, Arithmetic, Vocabulary, Comprehension, Digit Span, Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding and Mazes. Sattler[1] states that according to Allen and Jefferson vision is essential for 10 out of the 12 subtests. They also point out that adaption (of the tests) is not feasible if vision is absent or more than mildly impaired. Sattler[2] agrees, particularly as regards the subtests in the Performance Scale. He states that, "the picture completion subtest can only be given to a child who is able to see".

Studies which have been performed on mentally retarded children reveal that they usually obtain significantly higher WISC Performance Scale IQ's than Verbal Scale IQ's. However the use of such vision dependent subtests raises the question of whether this may mask the innate intellectual ability of the OA child.

Bankes[3] states "that the earlier and better the visual sense functions then the greater the chance the child has of achieving his potential".

METHOD

The 58 children screened ranged in age from 7 to 13 years, of these 75% were boys and 25% were girls. Each child was screened at his public school in a familiar environment. Hence the children were not disturbed by the examination and their vision was easily assessed. Hatfield[4] states that Blackhurst and Radke found there was little or no need to modify normal testing procedures for the mildly retarded or educable child.

A routine examination was performed on each child. This comprised the following tests:

1. Observation: to disclose obvious ocular defects such as nystagmus, strabismus, ptosis, abnormal head postures or to note the presence of physical abnormalities like hemiplegia.
2. Cover test near.
3. Cover test 6 metres.
4. Cover test far distance — this was only included if a larger exophoria was demonstrated at 6 metres.
5. Ocular movements — gross abnormalities only were recorded including obvious muscle palsies, A or V patterns or specific ocular syndromes such as Duane's Retraction Syndrome.
6. Visual acuity. Vision was assessed monocularly for near and distance using a Sheridan Gardiner linear or single letter chart and an appropriate near test type.
7. Fixation behaviour was assessed in those children who demonstrated a difference in distance vision of one line or more.
8. Convergence was assessed on the RAF rule and repeated three times to check for fatigue.
9. Accommodation was assessed binocularly and monocularly on the RAF rule.
10. Binocular single vision was assessed using either Wirt/Titmus, TNO Random Dot or Lang's Pen Location test.
11. Colour vision was assessed by either Guy's Colour Plates for Young Children or Ishihara Colour Plates.
12. Maddox Wing.
13. Hand/eye dominance.

No assessment of the child's visual field was obtained.

RESULTS

Only the most significant results will be discussed.

Squint: Overall 20.6% of the children were found to have either an intermittent or constant strabismus. 6.9% had an intermittent strabismus most commonly an intermittent exotropia and 13.7% had a constant strabismus most commonly an esotropia.

Muscle abnormalities: 32 children were found to have no abnormality of extra ocular muscle function, however 26 children had one or more extra ocular muscle defects. The most common defect was slight overaction of the inferior oblique muscles associated with a normal physiological V pattern but not accompanied by ipsilateral superior oblique underaction. Nine children had diplopia on elevation and demonstrated a significant V exo pattern. One had an A eso and one a V eso pattern.

Convergence: Of the 50 children with heterophoria or intermittent strabismus, 48% had full convergence near points to 5 cms while 20% demonstrated a convergence near point of 8 cms or less.

Visual Acuity Standard: 31% of the children were found to have reduced vision in one or both eyes.

22.4% had unilaterally reduced vision that is a difference of one line or more between the two eyes.

8.6% had bilaterally reduced vision that is each eye had an acuity of 6/9 or less.

13.7% had vision of 6/12 or less in one or both eyes.

8.6% had near vision of N6 or less in one or both eyes.

Eccentric fixation: this was found in 12 children; four demonstrated eccentric fixation in the right eye only; two demonstrated eccentric fixation in

the left eye only, while six demonstrated bilateral eccentric fixation.

Stereopsis: 56.9% of the children demonstrated full stereo acuity on Wirt Stereo testing.

Colour vision: this was assessed in 23 children using Guy's Colour Plates. Seven girls and 16 boys were tested. Only 3 children had normal colour vision responses to all plates and 20 children had defective responses on one or more plates.

The defective responses to Guy's Colour Plates were made on only five out of the eight plates. Plates 5 and 6 were the two plates most commonly mistaken. 75% incorrectly named Plate 5 while 65% incorrectly named Plate 6.

Halfway through the screening programme we changed to Ishihara Colour Plates and of the 37 children tested 36 had normal colour responses to each plate and one child saw the control plate only — indicating total achromotopsia.

Interestingly two children were tested on both plates and the results showed that the child who made no errors on Ishihara saw plates 4, 5 and 6 incorrectly on Guy's. The child who demonstrated total achromotopsia on Ishihara saw plates 1, 2, 7 and 8 correctly on Guy's.

With such a large percentage of children scoring incorrect responses on Guy's Colour Plates one begins to question the validity of this test. We would certainly agree with McKenzie[5] that the Guy's Colour Plates are not suitable for the mass screening of children for the detection of colour vision abnormalities.

Many of the OA teachers reported that a large proportion of the children had difficulty with letter and number reversal.

Hand/eye dominance: our crude assessment of the hand/eye dominance of each child revealed that 31% had crossed dominance. This percentage is consistent with a study done by Woods[6] who found 29% of these children had hand-eye confusion.

A summary of the defects revealed that 50% of the children had an ocular defect such as amblyopia, strabismus, convergence insufficiency or a combination. Of these 50%:

20.6% had a convergence insufficiency of 8 cms or less, not associated with any other ocular defect.

27.5% had reduced vision not associated with any other ocular defect.

10.3% had a strabismus not associated with any other ocular defect.

41.3% had a combination of two or three defects.

Of interest were:

One child with a bilateral superior oblique palsy

One child with a left superior oblique palsy

One child with a left Duane's Retraction Syndrome with an abnormal head posture

One child with anisocoria

Five children with refractive error corrections

Two children with ptosis

One child with a positive angle alpha

Three children with nystagmus

One child with cerebral palsy

Two children with hemiparesis

One child with hemiplegia

One child with ataxia.

This study has revealed a significantly higher incidence of ocular defects in children classified as intellectually handicapped as compared to the normal child.

Our figure of 50% is consistent with Edwards, Price and Weisskopf[7] who in 1972 found 53% of children with an IQ range 70 to 85 had an ocular diagnosis.

Blackhurst and Radke as quoted by Hatfield[4] found the incidence of vision defects among the mildly retarded to be approximately double that of children in normal grades.

Of the children found to have ocular defects, only 13.7% were receiving eye treatment while 32.2% had an eye problem which was previously undetected and therefore untreated. Only one child complained of symptoms.

CONCLUSION

Intellectually handicapped children would seem therefore to be at risk in two ways. Firstly their eye problems seem largely to go unrecognised

and thus untreated. Secondly, because of the high visual dependence of the IQ tests these children are subjected to, the results may well underestimate their intellectual potential.

There is a need therefore for greater awareness of the importance of assessing the visual function of intellectually handicapped children.

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