Vision screening of adolescents and their use of glasses

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Summary and conclusions

Vision screening was performed in over 11 000 16-year-olds who were taking part in the National Child Development Study. For distance vision 75% had normal acuity, 9% a minor defect, and 16% a more severe unilateral or bilateral defect. For near vision 85% had normal vision, 8% a minor defect, and 7% a unilateral or bilateral defect. Few children (62) with normal distant vision had defects in near vision, though many more (607) had both poor distant vision and poor near vision. Vision defects were more common in girls than in boys and occurred more often in adolescents from non-manual than manual families. Although 18% of children had been prescribed glasses for current use, a third did not have their glasses available at the examination: 27% of the children prescribed glasses had normal unaided distant visual acuity or only a minor defect, and they constituted 42% of those who were not wearing their glasses.

Further investigation is needed into the criteria on which glasses are prescribed for children and into the reasons for which they are not worn.

Introduction

Information on the visual acuity of British schoolchildren is scarce. The results of vision screening at 7¹ and 11² in the children taking part in the National Child Development study (a longitudinal study of all children in England, Scotland, and Wales who were born in one week in March 1958³) have already been reported. We report here on visual acuity and the use of glasses in these children when they were aged 16, in their last year of compulsory schooling.

Method

Testing of distant and near vision was arranged by school medical officers. Distant visual acuity was assessed in 11 411 adolescents using a standard Snellen chart of block capital letters without serifs. The examiners were told to place the chart exactly 20 feet (6 metres) away from the child in a good light, level with the child's eyes, and free from glare. Each eye was tested separately, the other eye being occluded without pressure on the eyeball. Acuity was tested without glasses and then with glasses if they were available. Near vision was tested in 11 144 adolescents using a Sheridan-Gardiner card designed especially for the study.³ The card was held no further from the eye than 10 inches (25 cm).

If glasses had been prescribed for use "at the present time" the

examiners recorded whether they were available for the test. No inquiries were made about the use of contact lenses, but we assumed that few adolescents would have been wearing them in 1973.

To simplify the analysis the children were classified into six groups according to their visual acuity: normal vision—6/6 or better in both eyes; minor defect—6/6, 6/9 or 6/9, 6/9; unilateral moderate defect—6/6 or 6/9 in better eye, 6/12, 6/18 in other eye; unilateral severe defect—6/6 or 6/9 in better eye, 6/24 or worse in other eye; bilateral moderate defect—6/12 or 6/18 in better eye; bilateral severe defect—6/24 or worse in better eye. Similar groupings were made for near vision using the standard reduced Snellen nomenclature.

RESPONSE LEVELS

At the age of 16 some information was obtained on 87% of the 16 915 study children known still to be in the country and, except for a few minority groups, these were broadly representative of the total cohort.⁴ Our sample was further reduced because only just over 11 400 (67%) of the total cohort attended a medical examination. Analysis showed that our sample of 16-year-olds was representative in terms of sex and social class. We checked for further bias in the sample by comparing: (a) the proportion in each unaided distant vision group at 11 among those tested at 16 and among those not tested at 16; (b) the vision at 7 among those with data at 16 and among those with no data at 16; (c) the vision at 16 among those with data at 11 and among those with no data at 11; (d) the vision at 16 among those with data at 7 and among those with no data at 7.

Results

ACUITY

Uncorrected distant visual acuity—Altogether 75% of the 16-year-olds screened had normal visual acuity of 6/6 in both eyes. Nine per cent had minor defects and the remainder moderate or severe visual impairment which was unilateral in 6% and bilateral in 10%. In 631 adolescents (6%) visual acuity without glasses was 6/24 or worse in the better eye (table I). Significantly more girls than boys had impaired vision ($P < 0.001$), this difference being accounted for by the higher proportion of girls with bilateral defects. Visual defects were also significantly commoner among adolescents from non-manual than from manual family backgrounds⁵ ($P < 0.001$), and this social class difference was greatest among the group with severe bilateral visual impairment. A higher proportion of girls than boys had severe bilateral defects in both the non-manual and manual social class groupings.

Uncorrected near visual acuity—Over 85% of adolescents had normal near vision. Eight per cent had a minor defect in one or both eyes, and the remainder had moderate impairment which was unilateral in 4% and bilateral in 3%. Only 104 children (0.9%) had a severe bilateral defect of near vision.

Relation of distant to near vision—Table II shows that 83% of children had normal near and distant vision, or only minor defects (group A); 11% had only defects of distant vision (B); 1.5% had only defects of near vision (C); and 5.5% had defects of both near and distant vision (D). Only 62 (0.6%) children with normal distant vision had a moderate or severe defect of near vision in one or both eyes. But 607 (5.5%) children with defective distant vision (unilateral or bilateral) had near-vision defects. The four groups shown in table II were analysed by social class, and significantly more adolescents from non-manual families (14%) than from manual families (9%) had defects of only distant vision ($P < 0.001$), though social classes were equally represented among the other categories of visual impairment. A higher proportion of boys had normal near and distant vision ($P < 0.001$), whereas a significantly higher proportion of girls had impaired distant vision but satisfactory near vision ($P < 0.05$). More boys than girls ($P < 0.01$), however, had poor near and poor distant vision because of the higher proportion of boys with unilateral defects of near and distant vision. In contrast, similar proportions of boys and girls had defects of near vision only.

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preponderance of girls with defects of distant vision only. Another aspect of the difference between boys and girls was illustrated by the higher proportion of boys with unilateral defects of near and distant vision. Although we cannot explain this, amblyopia associated with squint may be a factor. The preponderance of adolescents from non-manual families with poor vision was due to the group with defective distant vision but normal near vision. The likely explanation is again the higher occurrence of myopia in non-manual families.⁶⁻⁹

Glasses had been prescribed for 18% of adolescents, 6% more than at 11 years, but a third of this group did not have their glasses available at the medical examination. Few adolescents seeing 6/9 or better with both eyes would welcome glasses or, arguably, would need them for medical reasons, yet 27% of adolescents prescribed glasses had normal distant visual acuity or only a minor defect and only a few of this group had defects of near vision alone. This group constituted 42% of those who failed to produce their glasses at the examination. Interestingly, fewer children with normal acuity were prescribed glasses in the northern region than elsewhere and significantly more girls than boys with normal vision possessed glasses. Distant visual acuity itself is clearly no guide to what is considered to be a need for glasses although it may indicate whether the glasses will be worn. It might be argued that these adolescents would see better with their glasses—that is, 6/5, which we did not record—but if this is so user rejection seems to indicate it is not desired by large numbers.

Further investigation is needed into the criteria on which glasses are prescribed and into the reasons for rejection by large numbers.

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Controlled trial of plasma exchange in treatment of Raynaud's syndrome

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Summary and conclusions

Twenty-seven patients with Raynaud's syndrome had their digital vessel patency assessed by Doppler ultrasound after different thermal stresses. Digital vessel patency rates differed significantly after stresses at 15°C and 45°C. In a randomised controlled trial placebo and heparin had no effect either on patients' symptoms or on the patency of their digital vessels. Plasma exchange improved both symptoms and vessel patency rates at 15°C and 21°C. Improvement in seven out of eight of these patients has been maintained for six months.

Assessing digital vessel patency by Doppler techniques allows continuous, atraumatic, and safe evaluation of the effects of different methods of treatment on the patency of the digital vessels and has helped to indicate that plasma exchange is a useful adjunct in the management of patients with severe Raynaud's syndrome.

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Introduction

Most studies have indicated that the symptoms and signs arising from Raynaud's syndrome are secondary to intermittent obstruction of the digital artery.¹⁻² This obstruction leads to a decrease in local tissue perfusion, which can be assessed by digital plethysmography.³ Plethysmography, however, is not entirely accurate⁴ and is difficult to apply to assessing individual digital segments. Previously vessel patency has been identified only by arteriography,⁵ often performed under general anaesthesia.⁶ We have been able to assess patency in the digital arteries of each finger from the web to the terminal phalange with a conventional doppler velocimeter.⁷ Since plasma exchange has been reported to be beneficial in managing patients with severe Raynaud's syndrome,⁸ we performed a prospective trial to compare the effects of a placebo, intermittent systemic heparinisation, and plasma exchange on the patency of the digital vessels in 27 patients with Raynaud's syndrome. We also used the technique to observe the effects of thermal stresses on digital vessel patency.

Patients and methods

Twenty-seven patients with Raynaud's syndrome unrelated to any proximal vascular lesion or trauma to the digital vessels were entered consecutively into the trial and were randomly allocated to one of three treatment groups: (a) placebo (nine patients), two tablets twice a day for four weeks; (b) intermittent heparinisation (nine patients), 3000 IU intravenously each week for four weeks; (c) plasma exchange (nine patients), 2.0-2.5 l/week for four weeks, 70-75% of total plasma being exchanged on each occasion. Of the nine patients in the plasma