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Spectacle prescribing in childhood: a survey of hospital optometrists

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ABSTRACT

Background/aims: To determine the spectacle prescribing practices of hospital optometrists for infants and young children.

Methods: A two-part survey relating to the prescribing of spectacles for non-strabismic children aged one to five years was distributed to all delegates at the 2006 Annual Hospital Optometrists Conference.

Results: A total of 93 of the 149 optometrists returned the survey. The threshold level at which 50% of the respondents would consider prescribing spectacles in non-strabismic children at ages one, three and five years were for hyperopia 4.50 DS, 3.00 DS and 2.50 DS, for myopia -3.00 DS, -1.50 DS and -1.00 DS, for anisohyperopia 2.00 DS, 1.00 DS and 1.00 DS and for non-oblique astigmatism 2.50 DC, 1.50 DC and 1.00 DC. For hyperopic children in the three to four-year age group at least two thirds of those recommending spectacles would give a partial correction, with an average reduction of 1.69 DS from the cycloplegic refraction.

Conclusions: Delegates of the Hospital Optometrists Annual Conference recommend spectacles to correct lower levels, on average, of myopia and hyperopia in young children than members of the American Association of Pediatric Ophthalmology and Strabismus or those suggested in the American Academy of Ophthalmology preferred practice patterns guidelines. There is, however, broad agreement for the management of astigmatism and anisometropia and the prescription of partial corrections in hyperopic children in the absence of strabismus.

It is well established that uncorrected refractive error in childhood can be associated with the development of amblyopia and strabismus.¹⁻⁴ Clinical and scientific opinion varies as to the level that places a child at significant risk. Normative data for refractive error in infancy and early childhood⁵⁻⁷ are widely available from a number of well-designed studies and reviews and provide an indication of the extreme values that can be considered clinically significant. The increasing kurtosis of the refractive error distribution during early childhood creates difficulty with the interpretation of population means and standard deviations. The situation is further complicated by the possibility that intervention can interfere with normal emmetropisation in young children.⁸⁻⁹ Most often, the appropriateness of spectacle correction is determined by the needs of the individual patient and is influenced by the experience of the practitioner.

Prescribing recommendations that are currently available are based on clinical consensus either among a relatively small panel of ophthalmologists,¹⁰ or on surveys of opinion of paediatric ophthalmologists in the United States.¹¹⁻¹²

Although these guidelines are a useful benchmark, it has been shown that prescribing practices can differ between ophthalmologists and optometrists. In a survey of the two professions Lyons *et al*¹³ found that ophthalmologists required a higher level of hyperopia before considering spectacles in children under four years of age, which would seem to be borne out when the prescribing strategies described in optometric text books¹⁴⁻¹⁵ are compared with those available from ophthalmology sources. Guidelines produced by professional bodies in the United Kingdom are scarce and incomplete.¹⁶⁻¹⁷ In the light of this, the present study aims to establish a clinical consensus for UK optometrists as a useful adjunctive guide to clinical decision making.

METHODS

Infants and young children are referred to the Hospital Eye Service from a variety of sources, including health visitors, general practitioners, vision screening services and community optometrists. Consequently, hospital optometrists are usually experienced in the examination of young children considered to be at risk of strabismus or amblyopia.

There are approximately 450 optometrists working in hospital clinics in the United Kingdom. A questionnaire was issued to 149 optometrists at the 2006 Annual Hospital Optometrists Conference. Respondents returned their completed questionnaires to the conference reception over the period of the two-day conference. The questionnaire was divided into two sections, with the first asking the respondent to write a dioptric value to indicate the minimum level of hyperopia, myopia, anisometropia in a hyperope (anisohyperopia) and non-oblique astigmatism at which they would "consider prescribing spectacles in a non-strabismic child" of ages one, three and five years. The second section detailed five case records, which included information on the child's age, family history, distance and near vision, distance cover test (DCT) and near cover test (NCT), stereopsis and cycloplegic refraction (cyclo ref). The retinoscopy result stated was corrected for working distance. Respondents indicated whether spectacles would be prescribed, whether this would be a full or partial correction, advised for full or part-time wear and completed a suggested spectacle prescription as appropriate.

RESULTS

Ninety-three optometrists responded (62%), many of these (32%) had been practising for over 20 years, with only a few (2%) having practised for

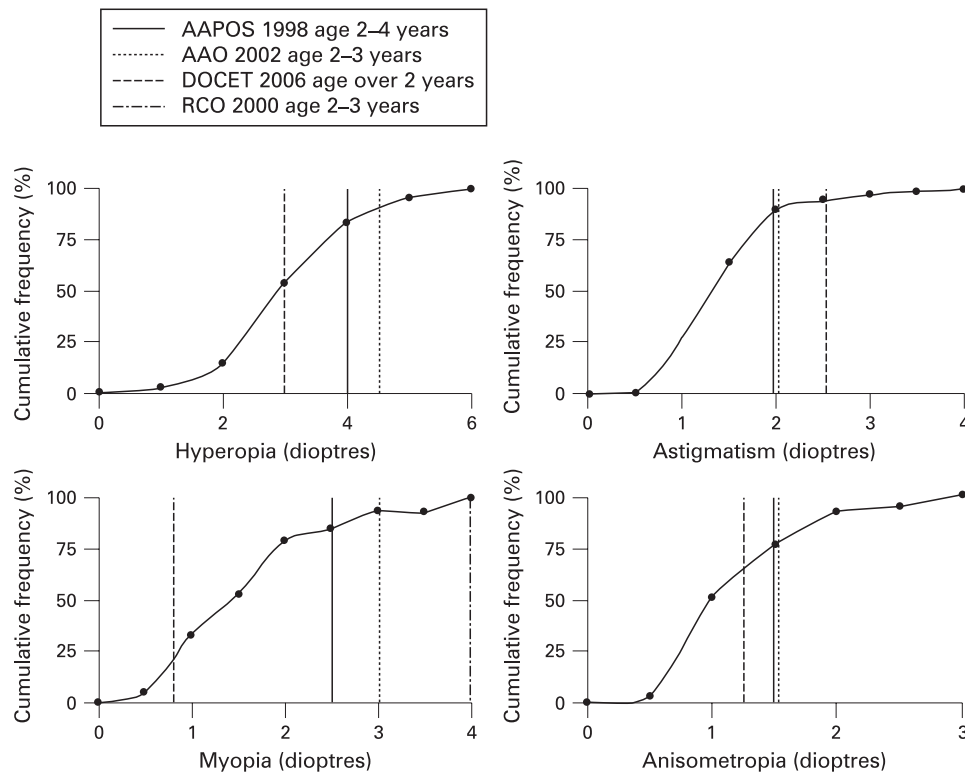


Figure 1 Cumulative frequencies of optometrists considering prescribing spectacles in a three-year old child for a given level of ametropia: Comparison with published guidelines.

AAPOS, American Association of Pediatric Ophthalmology and Strabismus; AAO, American Academy of Ophthalmology; DOCET, Directorate of Optometric Continuing Education and Training; RCO, Royal College of Ophthalmologists.

less than five years. Likewise, a large proportion (32%) performed refractions on more than 15 children each week, and only a minority (5%) did not routinely see children as part of their current practice.

The mean and range of values denoting the minimum level of ametropia at which spectacle correction would first be considered are shown in table 1, together with the level at which 50% of respondents would consider prescribing spectacles. Not all respondents answered every question, as is indicated in the "number of respondents" column in table 1. The reason for the omissions is unknown; it is possible that the respondents considered that they would not prescribe at any level of ametropia in these cases or may have resulted from

simple oversight. Therefore no correction was made for the missing data. In fig 1, these data are represented as the cumulative frequency of optometrists who would consider prescribing at a given dioptric value, in each refractive category, for a three-year-old child. These are compared with guidelines published by professional bodies and comparative survey data.

Four of the five case records detailed hyperopic children, between three and four years of age. The responses for these case records were in broad agreement with the responses in table 1 (see details for case 1, box 1).

No spectacles were recommended by 70% (65) of respondents, a reduced correction for full-time wear by 16% (15), a reduced prescription for part-time wear by 6.5% (six), full

Table 1 The dioptric values at which practitioners would consider prescribing spectacles in a non-strabismic child of a given age

	Age (years)	50%* (dioptries)	Mean (dioptries)	Maximum (dioptries)	Minimum (dioptries)	No of respondents
Hyperopia	1	4.50	5.02	15.00	2.00	90
	3	3.00	3.40	6.00	1.00	91
	5	2.50	2.54	5.00	1.00	91
Myopia	1	-3.00	-3.47	-10.00	-0.50	88
	3	-1.50	-1.87	-10.00	-0.25	92
	5	-1.00	-0.98	-3.00	-0.25	92
Anisohyperopia	1	2.00	2.08	8.00	0.25	90
	3	1.00	1.38	3.00	0.25	91
	5	1.00	1.10	3.00	0.25	90
Astigmatism	1	2.50	2.63	8.00	1.00	90
	3	1.50	1.60	4.00	0.25	92
	5	1.00	1.13	2.50	0.25	90

*The 50% column indicates the level at which 50% of the respondents would consider prescribing a spectacle correction.

Box 1 Case 1

Age	3 Years, 6 months
History	Father convergent strabismus
Vision	R 6/6 L 6/6 (Sheridan Gardiner singles) Near vision not recorded
DCT	Orthophoric
NCT	Small exophoria
Stereopsis	55" (Frisby)
Cyclo ref	R+3.50/-0.50×180 L+3.50/-0.50×180

correction for full-time wear by 5.5% (five) and a full correction for part-time wear by 2% (two). It should be noted that the hyperopia in this case falls at the mean level at which practitioners responded that they would consider prescribing spectacles (table 1), suggesting that other factors are influential in the decision of the majority not to prescribe in this case. An average reduction of 1.22 DS compared with the full cycloplegic refraction was recommended by the practitioners suggesting a partial correction.

Two of the other three hyperopic cases aged three to four years were anisometric. The first had +3.25 DS of hyperopia in the least hyperopic eye and 1.00 DS of anisometropia, with one line of amblyopia on the Crowded Kay Picture Test. Spectacles were recommended by 96% (89) of respondents, of whom 64% (57) would prescribe a partial correction. The average reduction for the sphere (range) was 1.21 DS (0.50 to 3.25 DS). The second case had +4.00 DS in the least hyperopic eye, anisometropia of 2.00 DS and one line of amblyopia on the Crowded Kay Picture Test. Of the 95% (88) of optometrists who suggested spectacles, 84% (74) would reduce the correction by an average (range) of 1.93 DS (0.50 to 4.00 DS).

The remaining hyperopic case had hyperopia of +10.25 DS with bilateral reduced vision, here 100% (93) of practitioners suggested spectacle correction, of whom 61% (57) recommended reducing the prescription by an average (range) of 2.05 DS (0.50 to 4.00 DS).

Overall, the average reduction recommended by those suggesting a partial correction of the spherical component of the ametropia was 1.69 DS across all the hyperopic cases.

The prescribing strategy for myopia and astigmatism in case 2 (box 2) also broadly reflected the response in section 1 of the questionnaire (table 1).

No spectacles were prescribed by 22% (20) of practitioners, 17% (16) prescribed a reduced correction for full-time wear, 2% (two) a reduced prescription for part-time wear, 54% (50) a full correction for full-time wear, and 5% (five) a full correction for part-time wear. For those prescribing a partial correction, the average reduction was 0.75 DS on the sphere and 0.35 DC on the cylinder. Therefore, the majority of practitioners elected to

Box 2 Case 2

Age	1 Year, 10 months
History	Half sibling strabismus and spectacles, maternal grandfather "strong" spectacles
Vision	R 6/9.5 L 6/9.5 (Cardiff cards)
DCT	Small exophoria, breaking down to slight alternating divergent strabismus
NCT	Small exophoria
Stereopsis	300" (Frisby)
Cyclo ref	R -1.00/-2.00×180 L -1.00/-2.00×180

prescribe spectacles, with most (55) suggesting a full correction and 12% (nine) of prescribers choosing to correct the cylinder fully and partly correct the sphere.

DISCUSSION

The results of the present study suggest that in many situations hospital optometrists are more likely to prescribe than their ophthalmologist colleagues (fig 1).^{10 11} The levels at which 50% of the optometrists in the population surveyed would consider prescribing spectacles adhere more closely to those outlined in optometric text books.^{14 15} Responses for threshold levels of hyperopia at which spectacles would be considered in the current survey (table 1) are lower than published guidelines derived from ophthalmology sources across all ages. They are, however, in close agreement with brief optometric guidelines in a recent Directorate of Optometric Continuing Education and Training publication.¹⁷

Responses are similarly slightly less conservative than the American Association of Pediatric Ophthalmology and Strabismus recommendations, and American Academy of Ophthalmology and Royal College of Ophthalmologists guidelines for myopia (fig 1), whereas the practices for anisometropia and astigmatism appear to be in broad agreement.

In common with previous surveys, there is considerable variability in the level at which individual practitioners indicate that they would consider prescribing spectacles for young children.^{11-13 18} These data represent the opinion of the optometrists and need not necessarily agree with their actual prescribing behaviour. A benefit of the recommendations described here is the comparison with decision making responses for case histories in which additional information was presented. Although the cases did not represent the whole spectrum of prescribing for which practitioners were asked to give recommendations, the results reassuringly reflected a similar prescribing behaviour to the responses given in the first section of the survey. There were slight deviations, the prescribing behaviour was more conservative in cases of good visual acuity and binocular vision responses, whereas the opposite was true in anisometric cases with any evidence of amblyopia, as would be expected. In clinical practice decisions can also be influenced by the repeatability of test results on subsequent visits, a situation that is not easily modelled in a survey format.

It should be noted that these data reflect the opinion of hospital optometrists and may not mirror the decisions of their colleagues in community practice. The wide variation in prescribing practice demonstrated in fig 1 would indicate that opinion is very likely to differ within and between ophthalmic professions.

In addition, data are provided on the average reduction in the prescription suggested by the practitioners prescribing partial spectacle corrections. This practice is common among our respondents, with approximately two thirds or more of the practitioners who did recommend spectacles suggesting that they would prescribe a partial correction. A greater percentage of practitioners recommended a reduced spectacle correction in the case with the highest hyperopia, but it can be seen that the reduction was fairly constant across the hyperopic cases, which suggests that it is more greatly influenced by the normative range of refractive error for the child's age, rather than bearing a strong relationship to the overall level of hyperopia or the uncorrected vision. Overall, this practice is in agreement with the American Academy of Ophthalmology guidelines, which suggest a reduction of up to +2.00 DS in hyperopes with no manifest strabismus and is supported by empirical data on the impact of partial spectacle correction on normal emmetropisation.¹⁹ The

practice of prescribing full hyperopic correction in children with esotropia, however, remains widely advocated.²⁰

These data provide a useful indicator of the general consensus among hospital optometrists for spectacle prescribing in young children.

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