

## Quality of spectacles in school going children in urban India

Dear Editor,

Recently, Gogate *et al.* reported a poor compliance (300 out of 1018 [30%]) of spectacle wear amongst rural secondary school children.<sup>[1]</sup> About 17.4% of children in the same study reported "broken spectacles" as the cause of non-wear. In a fresh report, Mohan<sup>[2]</sup> stated that about 22% of spherocylinders in adults have optically and clinically significant errors in dispensing.

We feel the issue of dispensing spectacle frames and lenses need further evaluation especially in young children. Incorrect frame fitting may have far-reaching consequences on the compliance to spectacle wear and inappropriate lenses would have an additional negative impact on the vision of the patient.

We evaluated the spectacles (frames and lenses) of 54 consecutive children based on predefined criteria [Table 1]. The mean age of the children was 8.4 years (standard deviation [SD]  $\pm 2.7$ , range: 5-15 years) of which 31 were males and the average duration of spectacle wear was 9.4 ( $\pm 6.2$ , 0.5-24 months).

We required a sample size<sup>[3]</sup> of 51 patients for group comparison and performed Chi-square test to derive the *P* value. ( $n = 2 [Z1 - \alpha/2 - Z1 - B] 2Xp[1 - p]/d^2$ , 80% power, 5% significance, 10% effect size).

About 61.1% children used plastic frames, 14.1% used metal frames and 24.1% used combination frames (hybrids). Evaluation of frame fitting revealed good four point touch in 55.6%, fair in 18.5% and poor in 26%. The eye wire was optimal in 62.9% and suboptimal in 38.1%. The nose bridge was graded as not good in 66.7%. The temple parallelism was good in 27.7% and poor in 72.3%. The temple pressure was ideal in only 53.7%. The temple length was adequate in 48% and inadequate in 51.8%.

The spectacle lens evaluation revealed a mean decentration of 3.5 mm (SD  $\pm 1.4$ , range: 1-6). Plastic lenses were used in 94.4% and glass lenses in 5.6%. The lens surface was graded good in 16.6%, fair in 37% and poor in 46.3%. The mean error

in the lens power was 0.02D (SD  $\pm 0.5$ D range: -4.0D to +1.0D). The mean error in cylinder axis was 4.4° (SD  $\pm 11.0$ , range: 0-90).

Overall, quality of spectacle fitting was 1.25 on a scale of 0-3 (0 = worst, 3 best) and quality-of-lens was 1.67 on a scale of 1-3 (1 = poor, 2 = fair, 3 = good).

No statistically significant differences [Table 2] were found in the overall quality of frame fitting or quality of lenses between the age group (less than or more than 7 years [*P* = 0.7,1.0]), gender (male or female [*P* = 0.3,0.2]), type of frame (metal or plastic [*P* = 1.0]) and type of lenses (plastic or glass [*P* = 0.9]) and duration of wear (less than 6 months or more than 6 months [*P* = 0.5,0.2]).

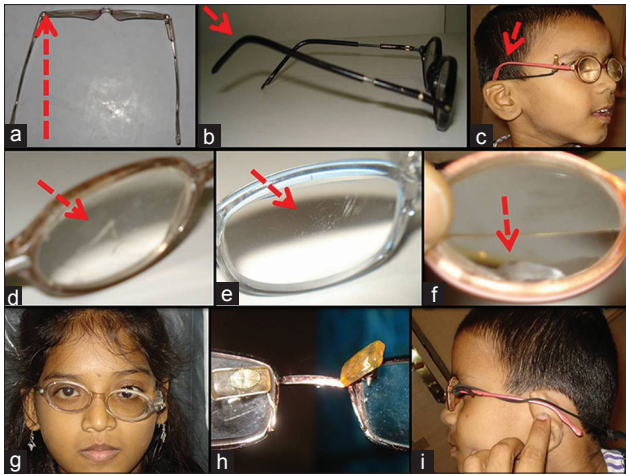
We concluded that the optical dispensing (frames as well as lenses in its entirety) in children was poor irrespective of the gender, age, type/material of the frame or duration of wear [Fig. 1]. More patient (parent) education and responsiveness

**Table 2: Criteria for ideal spectacle frame and spectacle lens in children**

Spectacle frame criteria	
Four point touch test	All four points on the spectacle frame (two points from each side of eye wire and one each from temple) should touch the flat surface simultaneously when placed as shown in Fig. 1b
Eye wire	Should cover both the eyes completely all around permitting the patient to view from the spectacle in various ocular positions and head positions without coming in contact of periocular skin
Nose pads	They should sit symmetrically on the lateral side of the nose bridge and it should be angled in a manner that prevent repeated slippage or excessively close placement of spectacle lens resulting in eyelash brushing the lens or repeated oil/sweat drop-lets from eye brow fogging/smudging the lens
Temple	
Parallelism	The temples should be parallel to each other
Pressure	There should be mild, uniform and symmetric pressure of the temples on the forehead without causing serious imprinting on the skin. A metallic component of the temple should not come in contact of skin
Length	The temple should not project more than 2 mm out beyond the mastoid bone
Spectacle lens criteria	
Centration error in millimeters (mm)	The optical center should be within 2 mm of visual axis
Power error in D	$\leq 0.25$ D
Axis error in degrees	$\leq 5^\circ$
Surface quality	The surface should have to fractures/pitting/scratches in the center of the lens

**Table 1: Criteria used for spectacle frame and spectacle lens evaluation**

Spectacle frame criteria			
Four point touch test	Good	Fair	Poor
Eye wire	Optimal	Suboptimal	
Nose pads	Good	Not good	
Temple			
Parallelism	Good	Poor	
Pressure	Ideal	Suboptimal	
Length	Adequate	Inadequate	
Spectacle lens criteria			
Centration error in millimeters (mm)			
Power error in diopters (D)			
Axis error in degrees			
Surface quality	Good	Fair	Poor



**Figure 1:** Examples of poor spectacle frames and lenses in children. (a) Temple non-parallelism, (b) Loss of four-point touch, (c) Short temple length, (d) Lens scratches, (e) Lens pits and scratches, (f) Lens chipping, (g) Poor overall fit, (h) Not good nose bridge and (i) Poor mastoid bend

of the opticians is needed to improve the quality of spectacle dispensing. Both, the frame evaluation and lens evaluation are necessary.

It may be advisable that the patient come back with the newly dispensed spectacle for a quality check to the ophthalmologist soon after they are dispensed. The ophthalmologists must refer to ideal fitting and quality criteria [Table 2] to ensure an optimum lens and frame dispensing.

Further studies are needed to assess the impact of improved

spectacle fitting and quality of lenses on the compliance of spectacle wear in children, which in turn may translate in the better and faster visual rehabilitation.

*Mihir Kothari, Krishna B Darji, Prashant Bhagat*

Department of Pediatric Ophthalmology, Aditya Jyot Eye Hospital, Wadala, Mumbai, Maharashtra, India

Correspondence to: Dr. Mihir Kothari, Jyotirmay Eye Clinic for Children and Adult Squint, Ocular Motility Lab and Pediatric Low Vision Center, 205 Ganatra Estate, Khopat, Thane West, Thane - 400 601, Maharashtra, India. E-mail: drmihirkothari@jyotirmay.com

## References

- Gogate P, Mukhopadhyaya D, Mahadik A, Naduvilath TJ, Sane S, Shinde A, *et al.* Spectacle compliance amongst rural secondary school children in Pune district, India. *Indian J Ophthalmol* 2013;61:8-12.
- Mohan K, Sharma A. How often are spectacle lenses not dispensed as prescribed? *Indian J Ophthalmol* 2012;60:553-5.
- Naduvilath TJ, John RK, Dandona L. Sample size for ophthalmology studies. *Indian J Ophthalmol* 2000;48:245-50.

### Access this article online

#### Quick Response Code:



#### Website:

[www.ijo.in](http://www.ijo.in)

#### DOI:

10.4103/0301-4738.128640