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Spectacle wear in children reduces parental health-related quality of life

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Abstract

Purpose—To investigate whether spectacle wear in children affects responses on the Intermittent Exotropia Questionnaire (IXTQ) or the Pediatric Quality of Life Inventory (PedsQL).

Methods—We recruited 49 children, median age 8 years (range, 5–13), presenting with visual acuity 20/40 or better and an otherwise normal eye examination (no strabismus), who either had no refractive error ($n = 29$) or had refractive error corrected with spectacles ($n = 20$). The IXTQ and PedsQL were completed, each comprising a child report (Child IXTQ, Child PedsQL) and a parent proxy report (Proxy IXTQ, Proxy PedsQL). In addition, the IXTQ contains a parent self-report (Parent IXTQ). Each questionnaire is scored from 0 (worst health-related quality of life [HRQOL]) to 100 (best HRQOL). Median scores were compared using Wilcoxon rank-sum tests.

Results—Child IXTQ and Proxy IXTQ scores were similar between groups; nevertheless, Parent IXTQ scores were lower for spectacle wearers (90.4 vs 97.1, $p = 0.01$). Parent IXTQ questions that scored lower in the spectacle group were related to parental worry about permanent damage to their child's eyes, longterm eyesight, surgery, self-consciousness, and teasing. The PedsQL composite scores and all subscale scores were similar between spectacle wearers and nonspectacle wearers, both for Child PedsQL and Proxy PedsQL.

Conclusions—Parental HRQOL, measured using the Parent IXTQ, was lower for children wearing spectacles than for children who did not wear spectacles. There was no difference between spectacle and no-spectacle groups using either Child IXTQ, Proxy IXTQ, Child PedsQL, or Proxy PedsQL.

Introduction

The Intermittent Exotropia Questionnaire (IXTQ) is a newly developed and validated instrument for measuring health-related quality of life (HRQOL) in children with intermittent exotropia as young as 5 years for self-report and as young as 2 years for parent proxy report.¹ In contrast, the Pediatric Quality of Life Inventory (PedsQL) is a well-established, generic HRQOL instrument consisting of a parent proxy report for children as

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young as 2 years and a child self-report available in age-specific formats for children 5 years and older.²

Refractive errors are common in pediatric populations and are often treated with glasses.^{3,4} Some reports have shown that spectacle wear has a negative effect on self-esteem^{5,6} and increases the likelihood of childhood bullying,⁷ while other studies have shown no problems with self-esteem and self-concept.^{8,9} It is possible that spectacle wear alone may influence scores on some HRQOL instruments. The purpose of the present study was to evaluate the effect of spectacle wear on the IXTQ and the PedsQL.

Subjects and Methods

This study followed the tenets of the Declaration of Helsinki. Institutional review board approval was obtained and the parent of each child gave informed consent before participating. Children 8 years old or older provided assent. All procedures and data collection were conducted in a manner compliant with the Health Insurance Portability and Accountability Act.

Subjects

We prospectively recruited 49 children from outpatient clinics during their eye examination. We have previously reported¹ overall data collected from these subjects, comparing them with a group of children who had intermittent exotropia. In the present manuscript, we report data from these control children regarding whether spectacle wear alone influences HRQOL. Median age was 8 years (range, 5–13). Participants were required to have presenting visual acuity 20/40 or better with or without spectacles and an otherwise normal eye examination (specifically, no strabismus) and either had no refractive error ($n = 29$) or refractive error corrected with spectacles ($n = 20$). There were no significant differences in presenting visual acuity in either eye between children with or without spectacles (mean difference, -0.04 logMAR [95% CI, -0.09 to 0.01] in the right eye [$p = 0.2$]; and -0.03 logMAR [95% CI, -0.08 to 0.02] in the left eye [$p = 0.1$]). For each child, one accompanying parent or legal guardian was also recruited for the parent proxy-reports (Proxy IXTQ and Proxy PedsQL) and parent self-report (Parent IXTQ). Patients and parents were required to be comfortably conversant in English to be included. We did not recruit children younger than 5 years old since the Child IXTQ and Child PedsQL questionnaires were designed for children 5 years and older, and we specifically wanted to report child and proxy assessments.

IXTQ

The IXTQ consists of a parent proxy report, a child self-report, and a parent self-report (available at <http://public.pedig.jaeb.org/>, last accessed October 28, 2010). Child IXTQ and Proxy IXTQ contain 12 parallel items. The Parent IXTQ contains 17 items in 3 subscales: function, psychosocial, and surgical. There are no items regarding spectacle wear in the IXTQ.

PedsQL

The PedsQL consists of 23 parallel items in 4 subscales: physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items) (see: <http://www.pedsq.org/index.html>, full PedsQL questionnaires available by purchase only, last accessed October 28, 2010.) There are no items regarding spectacle wear in the PedsQL.

Questionnaire Administration

The child and one parent (or legal guardian) completed their respective portions of the IXTQ and PedsQL. Neither the parent or the child were made aware that spectacle wear was a variable of interest. Verbal and nonverbal communication between parent and child was limited during administration of questionnaires whenever possible. Children and parents were given simple verbal and written instructions and asked to base their responses on their experiences over the previous month. For 5- to 7-year-old subjects, Child IXTQ and Child PedsQL were administered by trained personnel who read the questions to the child and recorded their responses. A matching card with the three acceptable responses (Not at all, Sometimes, A lot) with corresponding face symbols was provided to the child to help with recording his or her response. For subjects older than 7 years, questionnaires were self-administered.

Scoring

Both Child IXTQ and Child PedsQL use a simplified format for 5- to 7-year-olds with a 3-point Likert type scale for responses: Not at all (score 100), Sometimes (score 50), A lot (score 0). For 8- to 17-year-olds, the Child IXTQ and Child PedsQL use a 5-point Likert type scale for responses: Never (score 100), Almost never (score 75), Sometimes (Score 50), Often (score 25), Almost always (score 0). Proxy IXTQ, Proxy PedsQL, and Parent IXTQ also uses a 5-point Likert type scale for responses: Never (score 100), Almost never (score 75), Sometimes (Score 50), Often (score 25), Almost always (score 0). Scores for each questionnaire and subscales were calculated for each patient by taking the mean of all answered items for the questionnaire or subscale.

Data analysis

Median and mean questionnaire scores and individual item scores were calculated for each group (spectacles vs no spectacles). We then compared the distribution of IXTQ and PedsQL scores in spectacle and no-spectacle groups using Wilcoxon tests. Means are also presented as an additional way of representing the distribution of scores because, for some parameters, the median values were 100, as a result of a ceiling effect. Mean differences between spectacle and no-spectacle groups, with 95% confidence intervals, were also calculated.

Results

Child IXTQ and Proxy IXTQ

Child IXTQ scores were similar for both groups (median, 92.7 with spectacles vs 89.6 without; $p = 0.7$ [Table 1]). Although there were also no differences in composite Proxy IXTQ scores, (median, 97.9 vs 100; $p = 0.08$ [Table 1]), 4 individual items did show differences between groups with worse HRQOL in the spectacle group (Table 2). These questions were: “Q2. My child is bothered about people wondering what is wrong with his/her eyes”; “Q4. Kids tease my child because of his/her eyes”; “Q8. My child feels different from other kids because of his/her eyes”; and “Q9. My child worries about what other people think of him/her because of his/her eyes.” These questions pertain to teasing and self-perception.

Parent IXTQ

Parent IXTQ scores were lower in parents of children who wore spectacles than in parents of children who did not (composite median, 90.4 vs 97.1; $p = 0.01$ [Table 1]). Each of the 3 subscales (functional, psychosocial, and surgical) showed lower HRQOL scores in parents of children who wore spectacles ($p \leq 0.03$ for each comparison, Table 1). At the individual

question level, several questions showed significant differences between groups ($p \leq 0.03$ for each comparison [Table 3]): “Q3. I worry that my child will have permanent damage to his/her eyes”; “Q6. I worry that my child will get hurt physically because of his/her eyes”; “Q7. I worry about the possibility of surgery”; “Q8. I worry about my child becoming self-conscious because of his/her eyes”; “Q10. I worry about other kids teasing my child because of his/her eyes”; “Q14. I worry about my child’s eyesight longterm”; and “Q16. I worry about whether or not my child should have surgery” (Table 3).

Child PedsQL and Proxy PedsQL

PedsQL composite scores and all subscale scores were similar between spectacle wearers and nonspectacle wearers, both for Child PedsQL (composite median, 85.3 vs 83.7; $p > 0.5$ for composite and all subscales [Table 1]) and Proxy PedsQL (composite median, 95.7 vs 93.5, $p > 0.09$ for composite and all subscales [Table 1]). At the individual question level, the spectacle group had better HRQOL for one Proxy PedsQL question regarding whether or not the child worries about what will happen to them (mean, 96.3 with spectacles vs 86.2 without; median, 100 vs 100; $p = 0.04$). Number of subjects with complete PedsQL subscale scores varied between 29 and 27 due to unanswered items in a few questionnaires.

Discussion

We found no differences in composite HRQOL scores for children who wore spectacles and those who did not using Child IXTQ, Proxy IXTQ, Child PedsQL, and Proxy PedsQL HRQOL instruments. Nevertheless, assessment of parental HRQOL using the Parent IXTQ revealed that parents of children who wore spectacles had worse HRQOL than parents of children who did not wear spectacles. Parental HRQOL questions that scored lower in the spectacle group were related to worry about permanent damage to their child’s eyes, longterm eyesight, surgery, self-consciousness, and teasing.

Although the PedsQL has been widely used in nonophthalmic medical conditions, there are few reports of its use in vision disorders. The PedsQL has been used in congenital/infantile cataract¹⁰ and also in children with visual impairment and refractive error.¹¹ In the study of visual impairment and refractive error by Wong and colleagues,¹¹ adolescents (aged 11 to 18 years) with visual impairment were found to have lower HRQOL than those without visual impairment, but they found no association between refractive error and HRQOL and the effect of spectacles per se was not studied. In the present study we aimed to minimize the potential effect of reduced visual acuity on HRQOL by including only subjects with normal best-corrected visual acuity and found that spectacle wear made no difference to overall HRQOL scores using the PedsQL child and proxy reports.

Proxy rating of HRQOL is often used when assessing HRQOL in children due to the challenges of acquiring reliable self-reported data. Although there were no overall differences between spectacle wearers and nonspectacle wearers using Proxy IXTQ and Proxy PedsQL, some differences between groups began to emerge with individual questions related to teasing and self-perception when using the Proxy IXTQ (Table 2). Previous studies have reported an increase in physical and verbal bullying in children wearing spectacles,⁷ but these data were reported in interviews with individual children. It is interesting that in the present study, proxy reporting of HRQOL identified concerns regarding teasing in the spectacle wearing group at the individual item level, whereas these concerns were not reported by the children. We have previously reported a greater proportion of subnormal HRQOL scores in children with intermittent exotropia using the Proxy IXTQ than with the Child IXTQ when compared with their respective controls.¹² Further study is needed to better understand reasons for differences between child and proxy reporting of HRQOL in this population.

We found that parental HRQOL scores were lower (worse HRQOL) for parents of children who wore spectacles than for parents of children who did not wear spectacles, using the Parent IXTQ. All questions in the Parent IXTQ address worry about different aspects of their child's eye condition and a variety of concerns were highlighted in the individual questions that showed a significant difference between groups (Table 3). Two questions regarding possible surgery (Table 3) showed significantly lower scores for parents of spectacle wearers. Nevertheless, it is unknown whether or not this concern regarding potential surgery relates specifically to refractive error or another aspect of eye health.

Our study may be limited by a small sample size when we conclude that there were no differences in HRQOL between spectacle and nonspectacle wearers in Child IXTQ, Proxy IXTQ, Child PedsQL, and Proxy PedsQL, but the 95% confidence intervals around the differences suggest that we have not missed a large effect (Table 1). In contrast, the differences in parental HRQOL are significant and noteworthy. An additional limitation is the high frequency of maximum scores (100) for many items, creating a ceiling effect, reducing our ability to find a difference between spectacle and nonspectacle wearers. Nevertheless, a proportion of respondents rated many items as less than the maximum score, and our current report highlights these differences.

In conclusion, we found that spectacle wear in children did not affect Child HRQOL as measured by the Child IXTQ or Proxy IXTQ, but spectacle wear was associated with reduced HRQOL of the parents themselves as measured using the Parent IXTQ. Investigators should account for spectacle wear when using the Parent IXTQ.

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Table 1

Comparison of composite and subscale HRQOL scores between spectacle and no-spectacle groups using Child IXTQ, Proxy IXTQ, Parent IXTQ, Child PedsQL, and Proxy PedsQL. Median and mean $\pm$ SD values are shown. Higher scores indicate better HRQOL.

	Spectacles (n = 20)		No spectacles (n = 29)		Mean difference (95% CI) ^d	P-values ^b
	Median	Mean $\pm$ SD	Median	Mean $\pm$ SD		
Child IXTQ						
	92.7	88.1 $\pm$ 11.4	89.6	85.2 $\pm$ 14.4	2.9 (-4.8, 10.7)	0.7
Proxy IXTQ						
	97.9	93.2 $\pm$ 8.8	100.0	97.3 $\pm$ 4.4	-4.1 (-8.0, -0.3)	0.08
Parent IXTQ Composite score						
	90.4	84.6 $\pm$ 15.3	97.1	94.4 $\pm$ 6.4	-9.8 (-16.2, -3.4)	0.01
Function subscale	84.4	79.8 $\pm$ 17.5	93.8	90.6 $\pm$ 9.5	-10.8 (-18.6, -3.0)	0.03
Psychosocial subscale	96.4	89.5 $\pm$ 14.2	100.0	97.7 $\pm$ 5.7	-8.2 (-14.1, -2.3)	0.002
Surgical subscale	100.0	86.9 $\pm$ 21.6	100.0	98.3 $\pm$ 5.5	-11.4 (-19.8, -3.0)	0.02
Child PedsQL Composite score						
	85.3	83.1 $\pm$ 12.7	83.7 ^c	81.0 $\pm$ 16.0 ^c	2.2 (-6.5, 10.9)	0.8
Emotion subscale	80.0	78.5 $\pm$ 17.2	80.0 ^c	80.7 $\pm$ 18.7 ^c	-2.2 (-12.9, 8.5)	0.6
Social subscale	85.0	83.8 $\pm$ 14.8	85.0 ^c	77.0 $\pm$ 23.8 ^c	6.8 (-5.3, 18.9)	0.6
School subscale	82.5	80.5 $\pm$ 15.9	80.0 ^d	78.3 $\pm$ 19.7 ^d	2.2 (-8.6, 13.0)	0.9
Physical subscale	90.6	87.3 $\pm$ 13.1	89.1 ^c	85.6 $\pm$ 14.2 ^c	1.7 (-6.4, 9.8)	0.8
Proxy PedsQL Composite score						
	95.7	92.2 $\pm$ 11.1	93.5	92.7 $\pm$ 6.7	-0.5 (-5.6, 4.6)	0.4
Emotion subscale	95.0	93.0 $\pm$ 9.5	90.0	85.9 $\pm$ 13.8	7.1 (0.0, 14.3)	0.1
Social subscale	100.0	90.6 $\pm$ 15.8	100.0	96.2 $\pm$ 8.0	-5.6 (-12.5, 1.3)	0.3
School subscale	100.0	88.8 $\pm$ 17.3	90.0	90.3 $\pm$ 9.2	-1.6 (-9.2, 6.1)	0.5
Physical subscale	100.0	94.7 $\pm$ 11.3	100.0	96.3 $\pm$ 5.6	-1.6 (-6.6, 3.3)	0.97

HRQOL, Health-related quality of life; IXTQ, Intermittent exotropia questionnaire; PedsQL, Pediatric quality of life inventory; SD, standard deviation.

^a A positive value indicates the spectacle group had better HRQOL, a negative value indicates the spectacle group had worse HRQOL.

^b P-values are based Wilcoxon rank-sum tests

^c n = 28

^d n = 27 (for some subscales the number of Child PedsQL questionnaires available for analysis were less than 29 because of unanswered items)

Table 2

Comparison of individual item scores between spectacle and no-spectacle groups using Child IXTQ and Proxy IXTQ. Median and mean values are shown. Higher scores indicate better HRQOL.

Child IXTQ	Spectacles (n = 20)		No spectacles (n = 29)		P-value ^d
	Median	Mean	Median	Mean	
1	100.0	85.0	100.0	80.2	0.5
2	100.0	87.5	100.0	83.6	0.6
3	100.0	76.3	100.0	75.9	0.95
4	100.0	96.3	100.0	92.2	0.7
5	100.0	92.5	100.0	87.5	0.96
6	100.0	95.0	100.0	87.5	0.1
7	75.0	67.5	75.0	71.4	0.6
8	100.0	96.3	100.0	91.1	0.3
9	100.0	92.5	100.0	92.0	0.7
10	100.0	88.8	100.0	82.1	0.5
11	100.0	81.3	100.0	87.5	0.7
12	100.0	98.8	100.0	94.6	0.5
Proxy IXTQ					
1	87.5	87.5	100.0	90.5	0.3
2	100.0	90.0	100.0	98.3	0.03
3	100.0	95.0	100.0	96.6	0.4
4	100.0	90.0	100.0	100.0	0.002
5	100.0	94.7	100.0	98.3	0.3
6	100.0	95.0	100.0	97.4	0.2
7	100.0	96.3	100.0	99.1	0.4
8	100.0	92.5	100.0	100.0	0.005
9	100.0	91.3	100.0	100.0	0.005
10	100.0	92.5	100.0	94.0	0.9
11	100.0	96.1	100.0	94.8	0.9
12	100.0	98.8	100.0	99.1	0.8

IXTQ, Intermittent exotropia questionnaire; *HRQOL*, Health-related quality of life

^a *p*-values are based on Wilcoxon rank-sum tests.

Table 3

Comparison of individual item scores between spectacle and no-spectacle groups using Parent IXTQ. Median and mean values are shown. Higher scores indicate better HRQOL.

Parent IXTQ	Spectacle (n = 20)		No spectacle (n = 29)		P-value ^a
	Median	Mean	Median	Mean	
1 I worry about my child's eyes.	75.0	73.8	75.0	84.5	0.09
2 I worry that my child will be less independent because of his/her eyes.	100.0	88.8	100.0	96.6	0.07
3 I worry that my child will have permanent damage to his/her eyes.	100.0	85.0	100.0	95.7	0.02
4 I worry that my child doesn't see well.	62.5	70.0	75.0	83.6	0.051
5 I worry about how my child's eyes will affect him/her socially.	100.0	91.3	100.0	95.7	0.5
6 I worry that my child will get hurt physically because of his/her eyes.	100.0	92.5	100.0	98.3	0.03
7 I worry about the possibility of surgery.	100.0	87.5	100.0	97.4	0.03
8 I worry about my child becoming self-conscious because of his/her eyes.	75.0	78.8	100.0	96.6	0.001
9 I worry that my child will not be able to see the board at school.	75.0	76.3	75.0	79.3	0.8
10 I worry about other kids teasing my child because of his/her eyes.	100.0	87.5	100.0	99.1	0.003
11 It worries me what others will think about my child because of his/her eyes.	100.0	92.5	100.0	98.3	0.08
12 I worry that my child's eye condition will affect his/her personality.	100.0	93.8	100.0	98.2	0.4
13 I worry that my child's eyes will affect his/her social life if nothing is done.	100.0	91.3	100.0	98.2	0.2
14 I worry about my child's eyesight longterm.	75.0	70.0	100.0	91.1	0.01
15 I worry about my child's depth perception.	100.0	82.5	100.0	95.5	0.06
16 I worry about whether or not my child should have surgery.	100.0	86.3	100.0	99.1	0.01
17 I worry about my child's ability to make friends.	100.0	91.3	100.0	97.3	0.4

IXTQ, Intermittent exotropia questionnaire; HRQOL, Health-related quality of life.

^a p-values are based on Wilcoxon rank-sum tests.