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Comparison of Effect of Contact Lenses on Daily Life in Myopia and Myopic Astigmatisma: VF-14 Questionnaire

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Abstract

Purpose: To compare the visual functions of individuals with mild to moderate myopia (-2.00 D to -5.00 D) and myopic astigmatism (-1.25 D to -2.75 D) who are wearing contact lenses with those wearing spectacles.

Materials and Methods: Eighty participants (40 myopia and 40 myopic astigmatism) who have been followed up at our contact lens unit were included. All participants were using both contact lenses and spectacles. The VF-14 questionnaire was used to compare the impacts of contact lenses wearing versus spectacles on daily life.

Results: In myopic participants, the mean VF-14 scores for spectacles and contact lenses were 89.5±18.7 and 96.6±9.3 respectively ($p < 0.001$). There was a statistically significant difference between spectacles and contact lenses in following activities: watching TV, sports involvement, seeing steps/stairs, playing table games and cooking ($p=0.005$, $p < 0.001$, $p=0.003$, $p=0.008$, $p < 0.001$, respectively, paired t tests).

In participants with myopic astigmatism, mean VF-14 scores for spectacles and contact lenses were 88.7±21.8 and 98.3±6.3 respectively ($p < 0.001$). Statistically significant difference was found between spectacles and contact lenses for the following activities: doing fine handwork, driving at night, watching TV, sports involvement, seeing steps/stairs, playing table games, cooking and recognizing people at distance ($p=0.001$, $p=0.039$, $p=0.001$, $p < 0.001$, $p=0.031$, $p=0.027$, $p < 0.001$, $p=0.023$ respectively, paired t tests).

When two groups were compared in terms of all the questions, the VF 14 score was found significantly better in participants wearing contact lenses for the correction of myopic astigmatism during reading small print and doing fine hand work ($p=0.002$ and $p=0.005$, respectively; independent sample test).

Conclusions: Wearing contact lenses is more favorable than spectacles in most of daily activities in individuals with mild to moderate myopia and myopic astigmatism. It can improve the quality of life even further in individuals with myopic astigmatism.

Keywords: Contact lens; Myopia; Myopic astigmatism; Spectacles; VF-14 questionnaire

Introduction

Contact Lenses (CLs) are very common treatment modalities to correct refractive errors especially in young population [1, 2]. Besides the widespread usage of them, some problems like discomfort or infections accompany with the CL wearing. There has been–significant improvement in materials to solve these problems, so as to fit to all users [3].

Many CL wearers can benefit from toric contact lens correction. If all astigmatism of 0.50 Diopters Cylinder (DC) or more were corrected, 61.5% of wearers would require toric soft contact lens correction. If only astigmatism of 1.00 DC or more was corrected, 34.8% would require toric correction [4].

An indicator of satisfaction from the use of CLs or spectacles is the quality of life among these patients. There are several questionnaires, evaluating quality of life in patients with refractive errors [5-7]. Visual function 14 (VF-14) is a commonly used vision-related functional questionnaire.[8] Initially, it was designed to assess vision-related functions in patients undergoing cataract surgery, but it has also been validated for other eye conditions such as glaucoma, retinal, corneal diseases and CLs [9-15]. The VF-14 is easy to administer and to comply with.

The purpose of our study is to evaluate the impact of CLs wear vs. spectacles wear on visual function of young adults with mild to moderate myopia and myopic astigmatism, as they perceive it in their daily life, using the VF-14 questionnaire. We also aimed to evaluate in this study; whether is there a difference between patients with myopia and myopic astigmatism in terms of comfort in daily activities with contact lens wearing.

Methods

Eighty volunteer participants (40 myopia and 40 myopic astigmatism) who have been followed up at Izmir Bozyaka Training and Research Hospital Contact Lens department were included. Mean Best Corrected Visual Acuity (BCVA) for all patients was 10/10 binocularly. All participants were using both CLs and spectacles. All of them used monthly spheric lens Balafilcon A (Purevision HD, Bosch &Lomb) and toric lens Balafilcon A (Pure vision 2 for astigmatism, Bosch& Lomb) CLs. All participants used their CLs mean 10 hours and glasses mean 4 hours in a day. The VF-14 questionnaire was used to compare the impacts of wearing CLs versus spectacles on daily life of young participants. Study participants did not have any other

ocular disease except myopia and myopic astigmatism and also they didn't use extended wear CLs. The anterior segment was evaluated to ensure that subjects were free of pathology and had no history of previous corneal surgery. The upper age limit was set to 35 years in an attempt to limit age-related tear film changes, as well as to exclude presbyopic subjects. The study was conducted in accordance with the Declaration of Helsinki and approved by the Medical Ethical Committee of Izmir Bozyaka Training and Research Hospital. Informed consent was obtained from all participants.

Following method was used to fit CLs in all participants: Refractive errors were measured with auto refractometer (RK-F1; Canon, Tokyo, Japan). Subjective refraction was performed by using a Snellen chart. The lowest myopic and astigmatic values providing patients with best vision were determined. The first trial lens number was determined by substracting the vertex distance value from spectacle correction. After trial fitting CLs were prescribed.

All participants completed the VF-14 questionnaire twice, once for contact lens wear and second for spectacle wear, so as to assess the contact lenses wear vs. spectacles wear impact score on general daily living among the young individuals. It was used as translated in Turkish after following the 'translation-back translation' procedure. Participants rate their difficulty in performing daily activities ("No difficulty", "A little difficulty", "A moderate amount of difficulty", "A great deal of difficulty", "Unable to do"). Each question was scored on a scale from 0 (unable to perform an activity at all) to 4 (able to engage in activity fully). The average score was multiplied by 25 to give an overall score ranging from 0 to 100.

The SSPS, version 21.0 (IBM, Chicago, IL, USA) statistical package was used for data analyses. Statistical analyses included the chi-square, independent sample, paired t tests and Mann-Whitney U test. Pearson's correlation analysis was used for correlation between the magnitude of refractive error and VF 14 scores of contact lenses/glasses. A p-value < 0.05 was considered statistically significant.

Results

Mean age, sex, mean spherical equivalent and mean time for contact lens wearing of groups are shown on Table 1 and it was seen that both groups have the same features. The BCVA for all patients was 10/10 binocularly. Mean refractive error was -2.98±1.18 D (-2.00 D to -5.00 D) in myopic participants. Mean spherical equivalent was -3.38±1.06 D (-2.00 D to -5.00 D) in participants with myopic astigmatism. Astigmatic range was -1.25 DC to -2.75 DC.

The meanVF-14 scores for spectacles and contact lenses were 89.5±18.7 and 96.6±9.3 respectively in myopic participants ($p < 0.001$). There were significant differences between spectacles and contact lenses for following activities: watching TV, sports involvement, seeing steps/stairs, playing table games and cooking. ($p=0.005$, $p < 0.001$, $p=0.003$, $p=0.008$, $p < 0.001$; respectively, paired t tests). Whereas, correlation between driving at night and day scores of spectacles and refractive error on VF 14 was significant ($r=0.418$; $p=0.007$, $r=0.433$; $p=0.005$, respectively, Pearson correlation analysis). The responses of all participants in CLs and spectacles groups are showed in Table 2.

In participants with myopic astigmatism, the mean VF-14 scores for spectacles and contact lenses were 88.7±21.8 and 98.3±6.3 respectively ($p < 0.001$). Statistically significant differences were found between spectacles and contact lenses for the following activities: Doing fine handwork, driving at night, watching TV, sports involvement, seeing steps/stairs, playing table games, cooking and recognizing people at distance ($p=0.001$, $p=0.039$, $p=0.001$, $p < 0.001$, $p=0.031$, $p=0.027$, $p < 0.001$, $p=0.023$ respectively; paired t tests) (Table 2).

When the myopic and myopic astigmatism groups were compared in terms of all the questions for contact lenses, the VF-14 scores were found significantly better in participants wearing contact lenses for the correction of myopic astigmatism during reading small print or doing fine handwork ($p=0.002$ and $p=0.005$, respectively; independent sample test) (Table 3).

Individuals were classified in two groups as female (n=50) and male (n=30) to evaluate the difference on comfort in daily activities between contact lens wearers according to gender. The difference between two groups was not significant in terms of age, spherical equivalent and the duration of contact lens wearing ($p=0.236$, $p=0.516$, $p=0.157$, respectively, Mann-Whitney U test). It was noted that females have higher scores in driving at night, watching TV and seeing steps/stairs with contact lens wearing than males (Table 4).

Discussion

Our investigation showed that CLs are more comfortable than spectacles in daily activities in myopic and myopic astigmatism. Unfortunately, there is no enough study on this topic in literature. Aslam A et al16 found that spectacle wearers were more likely to leave their correction off for daily activities than CL wearers, wearing no vision correction for sports (50% vs. 10%), relaxing at home (33% vs. 12%), socialising (36% vs. 4%) 'out and about'(26% vs. 3%) and work/school (7% vs. 2%). Our VF-14 questionnaire scores revealed that the use of CLs is more comfortable compare to spectacles for both myopic and myopic

Table 1: Demographic features of myopic and myopic astigmatism groups

	Myopic groups (n=40)	Myopic astigmatic groups (n=40)	p value
Age±SD (years)	24.0±5.7	23.4±4.8	0.425*
Sex (Female:Male)	13:27	16:24	0.485**
Mean spherical equivalant ± SD (D)	-2.98±1.18	-3.38±1.06	0.110*
Mean duration of contact lens wearing±SD (months)	23.9±29.5	20.1±12.6	0.462*

*Independent sample test **Chi-square test

Table 2: Comparison of the Visual Function-14 questionnaire responses for contact lens and spectacle wear in participants with myopia and myopic astigmatism

Questions	Myopia			Myopic astigmatism		
	Mean scores for CL	Mean scores for spectacle	p value*	Mean scores for CL	Mean scores for spectacle	p value*
Reading small print	88.1±14.9	92.5±17.1	0.227	96.8±8.4	92.5±15.2	0.147
Doing fine handwork	95.6±9.6	88.7±19.6	0.070	100±0.0	90.6±15.7	**0.001**
Driving at night	91.3±13.3	91.2±18.4	1.000	96.3±9.0	89.4±21.1	**0.039**
Reading a newspaper	97.5±7.6	93.7±10.9	0.083	96.9±8.4	94.4±20.0	0.486
Reading signs	98.1±6.7	97.5±9.6	0.711	96.9±8.4	92.5±15.2	0.090
Watching TV	98.1±6.7	90.0±14.7	**0.005**	98.1±6.7	90.0±14.7	**0.001**
Sports involvement	98.7±7.9	58.1±25.6	**<0.001**	100±0.0	56.3±35.7	**<0.001**
Writing checks/ completing forms	97.5±7.6	96.9±8.4	0.743	98.8±5.5	98.1±6.7	0.660
Seeing steps/stairs	98.1±6.7	90.6±12.3	**0.003**	100±0.0	95.0±14.1	**0.031**
Playing table games	98.7±5.5	90.6±12.3	**0.008**	100±0.0	92.5±20.6	**0.027**
Reading large print	100±0.0	99.4±3.9	0.323	100±0.0	100±0.0	1.000
Cooking	97.5±7.6	76.3±21.1	**<0.001**	98.1±6.7	68.8±21.7	**<0.001**
Driving during the day	96.9±10.1	92.5±18.9	0.227	96.3±9.0	92.3±15.6	0.073
Recognising people at distance	96.3±10.7	95.6±10.2	0.785	98.1±6.7	95.0±14.1	**0.023**

*Paired t test
Statistically significant p values were written in bold.

Table 3: Comparison of mean scores for contact lens wear in myopia and myopic astigmatism

Questions	Mean scores for contact lens in myopic groups	Mean scores for contact lens in myopia astigmatic group	p value*
Reading small print	88.1±14.9	96.8±8.4	**0.002**
Doing fine handwork	95.6±9.6	100±0.0	**0.005**
Driving at night	91.3±13.3	96.3±9.0	0.053
Reading a newspaper	97.5±7.6	96.9±8.4	0.728
Reading signs	98.1±6.7	96.9±8.4	0.462
Watching TV	98.1±6.7	98.1±6.7	1.000
Sports involvement	98.7±7.9	100±0.0	0.320
Writing checks/ completing forms	97.5±7.6	98.8±5.5	0.402
Seeing steps/stairs	98.1±6.7	100±0.0	0.079
Playing table games	98.7±5.5	100±0.0	0.156
Reading large print	100±0.0	100±0.0	1.000
Cooking	97.5±7.6	98.1±6.7	0.697
Driving during the day	96.9±10.1	96.3±9.0	0.771
Recognising people at distance	96.3±10.7	98.1±6.7	0.349

*Independent sample test
Statistically significant p values were written in bold.

astigmatism, however, this superiority was more prominent in myopic astigmatism (Table 2).

Kanonidouet et al [15] reported that the myopic (mild to moderate) participants were facing more difficulty while they were wearing CLs, while doing fine handwork (i.e. sewing, knitting or carpentry), reading small print/newspapers or driving at night. Contrarily, in our study, no statistically significant difference was found between spectacles and CLs in myopic group while reading small print or doing fine handwork. However, CLs were found significantly superior to spectacles in other daily activities including watching TV, sports involvement, seeing steps/stairs, playing table games or cooking. Wearing CLs for myopic astigmatism was found additionally more comfortable while doing handwork, driving at night and recognizing people at distance. Different results may be a consequence of that all the participants were students in Kanonidou et al's study. Besides, if the difficulty of wearing spectacles during sports or cooking is considered; it is unlikely to get a VF-14 score of 100.

There is no study evaluating the effect of gender on daily activities in contact lens wearers. Our study reveals that contact lens wearing is more comfortable in females in some daily activities (driving at night, watching TV, seeing steps/stairs).

The first reliable questionnaire exclusively administered on patients with ocular disorders was the VF-14 questionnaire developed by Mangione in 1992.17 Initially, it was designed to assess vision-related functioning in patients undergoing cataract surgery, but it has also been validated for use with other eye conditions such as glaucoma, retinal, corneal diseases and contact lenses.9-15 One of the limitations of our study is the fact that we used the VF-14 questionnaire, although the National Eye Institute Refractive Error Quality of Life-42 (NEI RQL-42) has been also designed for the assessment of patients with refractive error.7 But, VF-14 Questionnaire is an easy to understand and short test.

In conclusion, the essential message of our investigation is that the use of both spectacles and contact lenses provide a

Table 4: Comparison of mean scores for contact lens wear in female and male

Questions	Mean scores for contact lens in females (n=50)	Mean scores for contact lens in males (n=30)	p value*
Reading small print	92.0±11.8	93.3±14.6	0.344
Doing fine handwork	97.5±17.9	98.3±6.3	0.612
Driving at night	96.5±8.8	89.2±14.2	**0.008**
Reading a newspaper	97.0±8.2	97.5±7.6	0.785
Reading signs	97.5±7.6	97.5±7.6	1.000
Watching TV	99.5±3.5	95.8±8.5	**0.017**
Sports involvement	100±0.0	98.3±9.1	0.197
Writing checks/ completing forms	98.5±5.9	97.5±7.6	0.513
Seeing steps/stairs	100±0.0	97.5±7.6	**0.024**
Playing table games	99.0±4.9	100±0.0	0.270
Reading large print	100±0.0	100±0.0	1.000
Cooking	97.5±7.6	98.1±6.3	0.612
Driving during the day	96.0±10.5	97.5±7.6	0.585
Recognising people at distance	97.0±9.6	97.5±7.6	0.977

*Mann-Whitney U test
Statistically significant p values were written in bold.

satisfactory visual function for daily activities in young individuals suffering from mild to moderate myopia and myopic astigmatism. However, wearing contact lenses can be more favorable than spectacles in the most of daily activities in individuals with mild to moderate myopia and myopic astigmatism. It can improve the quality of life even further in patients with myopic astigmatism. Results of this study may increase the prescription of toric contact lenses for patients with astigmatism, especially.

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