

Clinical Characteristics of Patients in Contact Lens Clinic, Siriraj Hospital

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ABSTRACT

Objective: To study the clinical characteristics of patients attending the contact lens clinic at Siriraj Hospital.

Methods: Retrospective chart indicates characteristics of new patients who attended the contact lens clinic at Siriraj Hospital from January 2008 to December 2009.

Results: One hundred and thirty three eyes were collected from 85 patients (50 females and 35 males) with the mean age of 31.87 years: 40 eyes were low refractive error, 23 eyes were high myopia, 22 eyes were high hyperopia, 18 eyes were high astigmatism, 18 eyes were high myopia and high astigmatism and 12 eyes were keratoconus. The mean pre-fitting visual acuity in all groups was 0.79LogMAR (range 0 to 2.6LogMAR). Soft sphere contact lenses were mostly prescribed in low refractive error patients while PMMA contact lenses were mostly prescribed in keratoconus patients. The mean final visual acuity with contact lenses in all groups was 0.2LogMAR (range 0 to 1LogMAR). No serious contact lens related complications were found in the follow up visit.

Conclusion: Many types of contact lenses can be used in different indications. Contact lenses can improve visual acuity substantially in high hyperopia patients. To wear contact lenses is a less invasive option for moderate keratoconus patients to improve vision. Patient's education for contact lens caring is important and should be emphasized to prevent irreversible contact lens related complications.

Keywords: Contact lens, clinical characteristic

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INTRODUCTION

Contact lens usage is one of the methods to improve vision other than glasses and surgical correction in refractive error patients. There are both optical and cosmetic purposes for contact lenses use.¹ One hundred and twenty-five million people use contact lenses worldwide²: 28-38 millions in the United States.² Several types of contact lenses were prescribed to patients with different indications in the contact lens clinic at Siriraj Hospital. Since there has not yet been recorder a clinical data collection from contact lens wearing patients, our objective was to study the clinical characteristics of patients attending the contact lens clinic at Siriraj Hospital.

MATERIALS AND METHODS

Retrospective chart reviews from January 2008 to December 2009 were done. The study protocol was approved by Siriraj Institutional Review Board (EC Number: 451/2552). Only new patients that attended the contact lens clinic at Siriraj Hospital were included. One hundred and seven charts of new patients were reviewed, 22 charts were excluded due to incomplete records and revisiting cases. Demographic data (age, gender and occupation) and the reasons for wearing contact lenses were recorded. The diagnosis was grouped as following:

1. **Low refractive error** as myopia or hyperopia less than 6.00 diopters (D) and refractive astigmatism less than 2.00D.
2. **High myopia** as myopia greater than or equal to 6.00D and refractive astigmatism less than 2.00D.
3. **High hyperopia** as hyperopia greater than or equal to 6.00D and refractive astigmatism less than 2.00D, including patients with nanophthalmos and aphakia from surgery or trauma.
4. **High astigmatism** as refractive astigmatism greater than or equal to 2.00D and myopia less than 6.00D or hyperopia

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less than 6.00D, including patients with corneal astigmatism from corneal scar.

5. **High myopia and high astigmatism** as myopia greater than or equal to 6.00D and refractive astigmatism greater than or equal to 2.00D.

6. **Keratoconus** patients were separately grouped.

Anisometropia was diagnosed when the difference of spherical equivalent between eyes was greater than 2.00D.

Other associated eye diseases such as glaucoma and strabismus and complications during the follow up period were recorded. Pre-fitting visual acuity, final visual acuity with contact lenses, change of visual acuity after contact lens wear and type of contact lens fitting were evaluated. Data was analyzed using descriptive statistics. The qualitative variable data was presented as number and percentage. The quantitative variable data was presented as the average (mean), standard deviation (SD) and range. The relationships of quantitative variable data, between clinical characteristics of patients and diseases, were statistically analyzed using one way ANOVA, Kruskal-Wallis Test and multiple comparisons by Tamhane tests. The clinical features, which were qualitative variable data, were statistically analyzed using chi-square test. The p-value of less than 0.05 was considered statistically significantly different.

RESULTS

There were 133 eyes from 50 female and 35 male patients with the mean age of 31.87 years (range 8 to 65 years). The youngest patient attending the contact lens clinic was 8 years old with unilateral high astigmatism from trauma. Most of the patients were students (38%). The patients were grouped by the diagnoses as Fig 1.

The mean pre-fitting visual acuity and refractive error according to the diagnoses were

1. **Low refractive error** (40 eyes): The mean pre-fitting visual acuity was 0.24LogMAR (range 0 to 1.8LogMAR). The mean spherical equivalence was -3.41D (range -6.38 to -0.50D).

2. **High myopia** (23 eyes): The mean pre-fitting visual acuity was 0.43LogMAR (range 0.02 to 2.3LogMAR). The mean spherical equivalence was -10.21D (range -19.63 to -6.63D).

3. **High hyperopia** (traumatic aphakia 11, surgical aphakia 9 and nanophthalmos 2 eyes): The mean pre-fitting visual acuity was 0.7LogMAR (range 0 to 2.3LogMAR). The mean spherical equivalence was +12.08D (range +10.00 to +16.50D).

4. **High astigmatism** (18 eyes): The mean pre-fitting visual acuity was 0.41LogMAR (range 0 to 1.5LogMAR). The mean refractive astigmatism was 3.48D (range 2.00 to 6.50D).

5. **High myopia and high astigmatism** (18 eyes): The mean pre-fitting visual acuity was 0.49LogMAR (range 0.06 to 1.1LogMAR). The mean spherical equivalence was -10.80D (range -14.88 to -7.25D). The mean spherical power was -9.07D (range -13.50 to -6.00D). The mean refractive astigmatism was 3.15D (range 2.00 to 7.00D).

6. **Keratoconus** (12 eyes): The mean pre-fitting visual acuity was 0.9LogMAR (range 0.3 to 2.3LogMAR). Most of these patients could not be evaluated for refractive error by autorefractor or power of anterior corneal curvature by keratometer. Computerized corneal topography was needed to evaluate the anterior corneal curvature. The mean average power of the anterior curvature of cornea was 53.86D (range 44.05 to 78.85D).

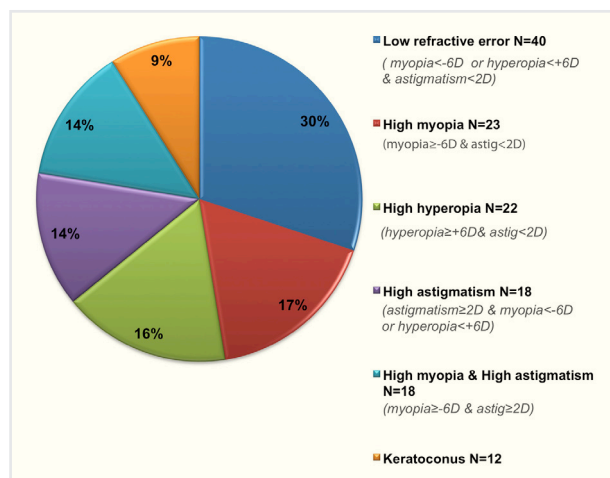


Fig 1. Diagnosis of patients in contact lens clinic at Siriraj Hospital

Anisometropia was found in 42 patients with the mean binocular difference of spherical equivalence 7.57D (range 2.00 to 16.63D). Most of these cases were unilateral traumatic aphakia (11 eyes) followed by unilateral surgical aphakia (9 eyes).

Glaucoma was found in 4 eyes with traumatic aphakia.

Strabismus was found in 9 eyes. Most of these patients had sensory exotropia in the worse eye.

Different types of contact lenses were prescribed (Fig 2). Seventeen eyes were not prescribed due to patients' preference not to wear them or already being a lens user and one had low endothelial cell count.

Table 1 shows the association between types of lenses that were prescribed and degree of refractive astigmatism. In the low refractive error group, soft sphere contact lenses were mostly prescribed but soft toric contact lenses and rigid contact lenses were also prescribed. The mean refractive astigmatism among these three groups was statistically different ($p < 0.001$).

In the high myopia group, all three types of contact lenses were prescribed even though the degree of refractive astigmatism was not statistically different ($p = 0.376$). In the high hyperopia group, only two types of contact lenses were prescribed. Rigid contact lenses were prescribed more than soft sphere contact lenses even when the mean refractive astigmatism was not statistically different ($p = 0.174$).

In the high astigmatism group, rigid contact lenses were mostly prescribed. The mean refractive astigmatism among these three groups was statistically different ($p = 0.030$).

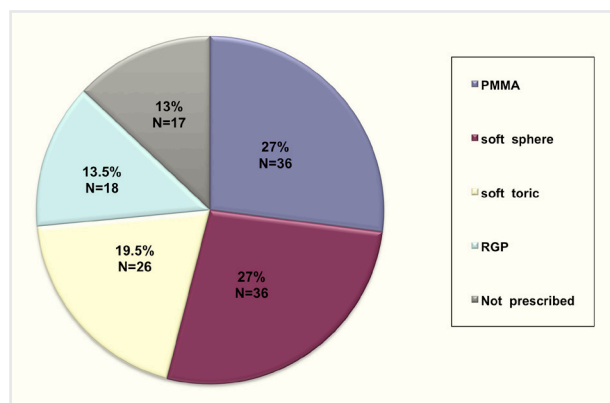


Fig 2. Prescribed lens types

TABLE 1. The mean spherical power and the mean refractive astigmatism in each type of prescribed lenses in each group of patients.

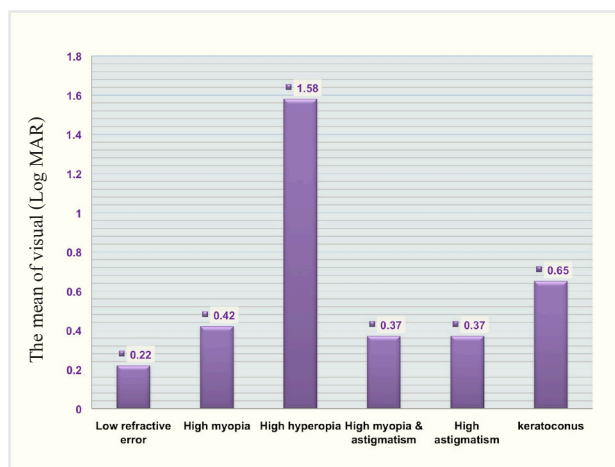
Patient group	No (%)	Spherical power(D)		Astigmatism(D)		p-value
		Mean (SD)	Range	Mean (SD)	Range	
Low refractive error						<0.001
Soft sphere contact lenses	17 (52)	-3.26 (1.75)	-5.75 to -0.25	0.48 (0.18)	0.25 to 0.75	
Soft toric contact lenses	13 (39)	-2.52 (1.72)	-5.50 to -0.50	1.45 (0.29)	1.00 to 1.75	
Rigid contact lenses	3 (9)	-2.50 (0.90)	-3.50 to -1.75	1.25 (0)	-	
High myopia						0.376
Soft sphere contact lenses	9 (45)	-10.11 (4.06)	-19.25 to -6.00	1.25 (0.33)	0.75 to 1.75	
Soft toric contact lenses	3 (15)	-9.00 (1.73)	-11.00 to -8.00	1.50 (0.25)	1.25 to 1.75	
Rigid contact lenses	8 (40)	-9.69 (2.58)	-12.50 to -6.25	1.50 (0)	-	
High hyperopia						0.174
Soft sphere contact lenses	5 (23)	+10.70 (1.57)	+10.00 to +13.50	0.63 (0.32)	0.25 to 1.00	
Rigid contact lenses	17 (77)	+12.53 (2.33)	+10.00 to +16.50	2.13 (1.52)	0.25 to 4.50	
High astigmatism						0.030
Soft sphere contact lenses	2 (12)	-2.00 (4.95)	-5.50 to +1.50	2.25 (0)	-	
Soft toric contact lenses	4 (25)	-2.06 (3.14)	-5.50 to +1.75	2.69 (0.47)	2.00 to 3.00	
Rigid contact lenses	10 (63)	+0.94 (2.17)	-1.75 to +4.50	4.19 (1.46)	2.25 to 6.50	
High myopia & high astigmatism						0.824
Soft sphere contact lenses	3 (20)	-7.75 (2.05)	-10.00 to -6.00	2.75 (0.90)	2.00 to 3.75	
Soft toric contact lenses	6 (40)	-10.13 (2.70)	-13.50 to -6.75	2.75 (0.65)	2.25 to 4.00	
Rigid contact lenses	6 (40)	-8.67 (1.44)	-10.25 to -6.75	3.75 (2.10)	2.00 to 7.00	
Keratoconus						
Rigid contact lenses	10 (100)	-5.31 (4.88)	-13.00 to +0.50	6.84 (4.02)	1.50 to 12.75	

In the high myopia and high astigmatism group, rigid contact lenses and soft toric contact lenses were prescribed equally, followed by soft sphere contact lenses, but the mean refractive astigmatism was not statistically different ($p=0.824$).

In the keratoconus group, all of the patients were prescribed rigid contact lenses. In this group, numbers of trial times were more than in the other groups.

The mean pre-fitting visual acuity in all patients was 0.79LogMAR (range 0 to 2.6LogMAR) and the mean final visual acuity with contact lenses in all patients was 0.2LogMAR (range 0 to 1LogMAR). The mean change in visual acuity was 0.6LogMAR. Compared to the other groups, the high hyperopia group had the most improvement of visual acuity after fitting contact lenses. Meanwhile, the low refractive error group had the least improvement of visual acuity after fitting contact lenses (Fig 3).

The mean final visual acuity and the mean change in visual acuity according to the diagnoses have been summarized in Table 2.

**Fig 3.** Changes in visual acuity after contact lens wear (Difference of Final VA with Contact lens and Prefitting VA)

Thirty-nine of forty-two anisometropic patients were prescribed contact lenses.

Six patients had binocular diplopia after improving vision with contact lenses. Five of these patients had unila-teral aphakia and 4 of them had exotropia in that eye.

Eye irritation was the most common complaint from the patients on follow up visits. This symptom was found in soft contact lens users more than in rigid contact lens users. Most often this symptom came from dryness not from poor fitting. No serious contact lens related complication was found in the follow up visits. The highest rate of the patients who were lost to follow up were found in the low refractive error group that were prescribed soft contact lenses.

DISCUSSION

Most of the patients attending the contact lens clinic had low refractive error. Although the majority of these patients could successfully improve their visual acuity with glasses, cosmetic and convenience were other reasons for choosing contact lenses. Therefore minimal improvement of visual acuity after using contact lenses was found in the low refractive error patients. Soft toric contact lenses and rigid contact lenses were also used in the low refractive error group, even though the astigmatic power was low, because some patients need astigmatic correction for perfect vision. Patient's expectation for the best vision is one of the reasons for selecting these types of contact lenses to correct astigmatism. Also, rigid contact lenses can correct corneal astigmatism better than soft contact lenses.³ Thus, the limitation of power of astigmatic correction of soft toric contact lenses is another reason for choosing rigid contact lenses instead.

The astigmatic power in the low refractive error group and in the high astigmatism group were statistically different among the three types of contact lenses, but we could not identify the difference between each group because there was too much difference in the sample size in each group. The degree of astigmatism was not statistically different in each type of contact lenses which was prescribed in the high myopia, high hyperopia and high myopia and high astigmatism

TABLE 2. The mean prefitting visual acuity and the mean final visual acuity and mean change in visual acuity after contact lens fitting in each group of patients.

Group	Mean (SD) prefitting VA	Mean (SD) final VA	Mean (SD) VA changes	p-value
Low refractive error	0.28 (0.48)	0.06 (0.16)	0.22 (0.38)	
High myopia	0.53 (0.56)	0.11 (0.15)	0.42 (0.47)	
High hyperopia	1.95 (0.50)	0.38 (0.30)	1.58 (0.63)	<0.001*
High astigmatism	0.64 (0.50)	0.27 (0.23)	0.37 (0.49)	
High myopia & high astigmatism	0.51 (0.33)	0.14 (0.20)	0.37 (0.30)	
Keratoconus	0.97 (0.58)	0.32 (0.16)	0.65 (0.54)	
Overall	0.79 (0.76)	0.20 (0.23)	0.60 (0.67)	

* Compared visual outcome of high hyperopia group with other groups

groups. There was the highest degree of astigmatism in the keratoconus group. Rigid contact lenses that can neutralize and correct high corneal astigmatism were the lenses of choice in these groups of patients.^{3,4} Fitting contact lenses in the keratoconus group was more complicated than other groups. Many fittings with trial and error were experienced.

In the high refractive error group, the mean improvement in visual acuity after fitting contact lenses was better than in the low refractive error group. This may be because contact lenses could eliminate the peripheral distortion and image magnification or minification that occurred with glasses, and contact lenses would help improve the quality of vision.³ Other than that, in this high refractive error group, contact lenses also improved the binocular balance in unilateral high refractive error patients.³

All of the patients with anisometropia improved both visual acuity and binocular balance by the elimination of aniseikonia by usage of contact lenses.³

Diplopia was found in anisometropic patients, especially in the patient that had sensory strabismus. We should be aware of and evaluate for diplopia after successfully fitting contact lenses in these patients. Some need muscle correction to eliminate diplopia after contact lens fitting. No serious complications were found in any group of patients, both those who used soft contact lenses and those who used rigid contact lenses.

CONCLUSION

Both optical and cosmetic reasons, are presented when choosing contact lenses instead of glasses. Appropriate type selection and fitting is the mainstay of treatment to improve visual acuity with contact lenses, especially in high hyperopic patients. To wear contact lenses is a less invasive option for moderate keratoconus patients to improve vision. Selection of the type of contact lenses was dependent on the availability of contact lenses, patient visual expectation and convenience. Patient education for contact lens care is important and must be emphasized to all contact lens users to prevent irreversible contact lens related complications.

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