

Multipurpose soft contact lens care in Japan

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Purpose: To assess the use of multipurpose lens care products via an online survey conducted among soft contact lens (SCL) wearers in Japan.

Methods: The subjects were 1000 men and women aged 15–44 years who reported that they cleaned their SCL by using multipurpose solution at least twice a week. Via the internet, they were asked questions about SCL care, the use of a rubbing step when cleaning SCL, cleaning and replacing lens cases, and recommended SCL care methods.

Results: Of the 1000 SCL wearers enrolled, 94.3% performed lens care every day lenses were worn, 64.2% reported rubbing the lenses every time, 57.9% rubbed the lenses for at least 10 seconds per side, and 64.7% reported they rubbed the lenses on both sides. Further, 61.2% reported that they had been given an explanation of SCL cleaning at an eye clinic or contact lens store. Only 49.8% of subjects reported that they cleaned the lens case every time and 61.7% replaced the case within 3 months. Only 19.5% had been given an explanation about lens case care. Half of the subjects reported they had been given no recommendation to use specific SCL care products or could not remember whether or not they had. The most common reason for the recommendation was good compatibility with their type of lens.

Conclusion: More education is needed in Japan regarding methods of SCL care to ensure correct lens cleaning with inclusion of a rubbing step, as well as sufficient cleaning and replacement of the lens case. Of particular interest is the finding that many subjects were not given an explanation about proper SCL care and lens case cleaning and replacement at the time of lens purchase or prescription.

Keywords: soft contact lens, multipurpose solutions, compliance, questionnaire survey, contact lens care

Introduction

Frequent-replacement soft contact lenses (SCL) and disposable SCL are used worldwide because the incidence of eye disorders is expected to be reduced by the shorter duration of use for each lens. This is also the situation in Japan; however, contrary to expectations, the incidence of eye disorders in Japan has actually increased with the adoption of frequent- and periodic-replacement SCL.^{1–3}

Cleaning, disinfection, and rinsing of SCL after wearing are essential to prevent the multiplication of pathogens that can cause infection.⁴ Multipurpose solutions (MPS) are the most popular lens care products, because cleaning, rinsing, disinfection, and storage can be performed with one solution. For example, 86% of SCL wearers use MPS in Japan.⁵ However, although various MPS products conforming to the specified standards have been approved and released, complications still occur among SCL

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wearers using these solutions.⁶ The purpose of this study was to assess the use of multipurpose contact lens solutions via an online survey of SCL wearers in Japan.

Methods

The study was conducted in accordance with all International Chamber of Commerce/European Society for Opinion and Marketing Research Code on Market and Social Research rules and all privacy laws. The survey was conducted via the internet in February 2010. The subjects were SCL wearers aged 15–44 years who reported cleaning their contact lenses using MPS at least twice a week. The subjects were randomly selected through a research monitor group contracted with the concerned research agency, and an email was sent directly to their registered email address to confirm qualification status. Only subjects who fulfilled the requirements and agreed to cooperate were allowed to enter the study. Subjects who mainly wore 1-week continuous-wear or daily-replacement soft lenses, who primarily wore or only wore spectacles, or who did not determine their brand of solution or purchase solutions themselves were excluded from the study. Those affiliated with promotional companies, research companies, public relations, mass media, contact lens manufacturers, contact lens retailers, optometrists, and ophthalmologists were also excluded from the study. The subjects were a total of 1000 SCL wearers (400 male and 600 female).

The questions were grouped according to the following topics: (1) frequency of lens care, (2) lens deposits/cleanliness, (3) inclusion of a rubbing step with cleaning of SCL, (4) cleaning and replacement of the lens case, and

(5) recommendations from an eye care professional about lens care methods. All questions are shown in Tables 2–6.

Results

Types of lenses and MPS reported by the participants

The types of lenses consisted of frequent-replacement SCL in 87.6% of 876 participants, planned-replacement SCL in 9.0%, and conventional SCL in 3.4%.

The types of MPS consisted of polyhexamethylene biguanide in 73.6%, polidronium chloride in 25.8%, and other MPS or unknown in 0.6% (Table 1).

Frequency of lens care

When subjects were asked to report the frequency at which they performed contact lens care, the most commonly reported response was “Every day that I wear lenses” which was given by 94.3% of the subjects. The data regarding frequency of contact lens cleaning are provided in Table 2.

Lens deposits/cleanliness

When subjects were asked to respond to questions regarding the level of anxiety with regards to lens deposits/cleanliness, 58.5% were either anxious (48.9%) or extremely anxious (9.6%) about deposits remaining on the lenses even after routine cleaning. Similarly, 63.4% (45.2%, 18.2% respectively), 65.1% (42.5%, 22.6% respectively), and 63.2% (42.1%, 21.1% respectively) of subjects were either anxious or extremely anxious about deposits on their lenses towards the end of the replacement cycle, eye dryness associated

Table 1 MPS brands as reported by the 1000 SCL wearers surveyed

Brand	Company	n	%
Polyhexamethylene biguanide (PHMB)			
ReNu® multi-plus	Bausch and Lomb, Rochester, NY	180	18.0%
ReNu®	Bausch and Lomb, Rochester, NY	106	10.6%
C Cube soft one	Rohto, Osaka, Japan	132	13.2%
Bioclen® one	Ophtecs, Kobe, Japan	99	9.9%
Complete® double moist	AMO, Santa Ana, CA	91	9.1%
Complete 10 min®	AMO, Santa Ana, CA	27	2.7%
Complete® protect	AMO, Santa Ana, CA	1	0.1%
Epica® cold	Menicon, Nagoya, Japan	50	5.0%
Comfort care®	CIBA Vision, Atlanta, GA	21	2.1%
FreshLook® care	CIBA Vision, Atlanta, GA	16	1.6%
One Bottle care	Aime, Yokohama, Japan	13	1.3%
Polidronium chloride			
Opti-Free®	Alcon, Hünenberg, Switzerland	187	18.7%
Opti Free® plus	Alcon, Hünenberg, Switzerland	71	7.1%
Other MPS or unknown			
Total		1000	100.0%

Abbreviations: MPS, multipurpose solution; SCL, soft contact lens.

Table 2 Subject responses regarding frequency of soft contact lens care

How often do you usually perform lens care?	n	%
Every day that I wear lenses	943	94.3%
Once every 2–3 days	46	4.6%
Once every 4–5 days	9	0.9%
Once every 6–10 days	1	0.1%
Less than once every 10+ days	1	0.1%
Total	1000	100.0%

with deposits, and discomfort associated with lens deposits, respectively (Table 3).

Cleaning SCL with the inclusion of a rubbing step

When patients were asked questions regarding whether or not they performed a rubbing step when cleaning their SCL, 64.2% of the subjects reported doing so every time they clean their lenses (Table 4). Of those who reported rubbing the contact lens during the cleaning process, 57.9% rub the lens for at least 10 seconds per side. Similarly, 64.7% of those who reported rubbing the contact lens, reported that they rub the lens on both sides.

When asked from whom they learned to include a rubbing step while cleaning their SCL, 61.2% of patients reported that they had received an explanation from an eye care professional. Similarly, when asked whether or not they had ever received an explanation or guidance about including a rubbing step while cleaning their contact lenses, 57.1% of the subjects reported receiving an explanation or guidance by an eye care professional or store assistant. However, 24.4% reported they had never been instructed to do so and 18.5% of the subjects could not remember receiving any explanation. Of 379 participants who answered this question (multiple answers), a large proportion (97.1%) reported that the main explanation that they had been given regarding the purpose of including a rubbing step was to remove deposits from the lens.

Table 3 Subject responses to questions regarding anxiety about lens deposits/cleanliness

	Deposits left even after routine cleaning process		Deposits towards the end of replacement cycle		Eye dryness associated with deposits		Discomfort associated with deposits	
	n	%	n	%	n	%	n	%
Extremely anxious	96	9.6%	182	18.2%	226	22.6%	211	21.1%
Anxious	489	48.9%	452	45.2%	425	42.5%	421	42.1%
Neutral	176	17.6%	156	15.6%	172	17.2%	180	18.0%
Somewhat anxious	201	20.1%	176	17.6%	146	14.6%	161	16.1%
Not at all anxious	38	3.8%	34	3.4%	31	3.1%	27	2.7%
Total	1000	100.0%	1000	100.0%	1000	100.0%	1000	100.0%

Lens cases

Approximately half of the subjects (49.8%) reported that they clean the lens case every time lens care is performed; however, 26.8% of subjects reported they did not clean the lens case at all (Table 5). Only 19.5% of subjects reported having received guidance regarding cleaning the lens case, while 49.9% reported never having received guidance on case cleaning. Similarly, only 17.7% of subjects reported they had received an explanation or guidance about replacing their lens case, while 52.5% reported they had never received an explanation or guidance regarding lens case replacement. Although 61.7% of patients reported replacing their lens case within 3 months (1 month: 12.3%, 2 months: 23.6%, and 3 months: 25.8%), 20.3% did not change their cases at all. Of those who reported lens case replacement, 69.7% reported replacing the case when a new case was obtained with the purchase of lens care solutions.

Recommendations about lens care methods

When asked whether or not specific instructions for use of the MPS or a specific brand of lens care product was recommended, 28.2% of subjects reported that no suggestion was made; 22.7% reported receiving a recommendation for both instructions for use and brand (Table 6). Surprisingly, 22.2% of SCL wearers could not remember whether or not specific instructions for use had been given or a brand recommended. When asked, "What was the reason for the recommendation?" the most common answer was that it was compatible with the subject's current SCL (36.8%) (multiple answers). Other common answers related to the disinfection efficacy of the product and applicability to other types of SCL.

Discussion

Contact lens wearers are reported to account for more than 10% of the Japanese population,³ approximately 10% of whom have been reported to experience problems with their contact lenses,⁷ accounting for 1% of the total Japanese population. In

Table 4 Subject responses to questions regarding cleaning of contact lenses, specifically related to the inclusion of a digital rubbing step

Question asked	Response	Number (%)
How often do you usually perform cleaning of your contact lens by rubbing?		
	Rub every time	642 (64.2%)
	Once every 2–3 times	72 (7.2%)
	Once every 4–5 times	12 (1.2%)
	Once every 6–10 times	1 (0.1%)
	Less than the above	1 (0.1%)
	Never rub lenses	272 (27.2%)
How did you find out about cleaning contact lenses by rubbing?		
	Instructed by eye care professional	612 (61.2%)
	Read package inserts	274 (27.4%)
	Read cleaning procedures suggested on manufacturer's homepages	15 (1.5%)
	Learned from family/friends	42 (4.2%)
	Read pamphlets/lens care instruction materials placed in clinics	36 (3.6%)
	Others	21 (2.1%)
Have you ever been given any explanation or guidance about cleaning contact lens by rubbing?		
	Have been given such an explanation or guidance by an eye care professional or store assistant	571 (57.1%)
	Have never been guided	244 (24.4%)
	Do not remember	185 (18.5%)
What explanation were you given about the purpose of cleaning SCL by rubbing? (n = 379, multiple answers)		
	Removal of deposits	368 (97.1%)
	Removal of bacteria	154 (40.6%)
	Avoid reduced vision	52 (13.7%)
	Avoid reduced comfort	73 (19.3%)
	Avoid trouble with allergies	86 (22.7%)
	Prevention of serious eye diseases	127 (33.5%)
	Others	3 (0.8%)

Abbreviation: SCL, soft contact lens.

Japan, the incidence of ocular complications due to contact lens wear has increased markedly, especially since 2007.⁸ This trend is related to an increase in the absolute number of contact lens wearers;^{8,9} however, it is also related to an increase in the number of younger contact lens wearers, a reduction of the price, revision of the Pharmaceutical Affairs Law in Japan in 2005 and the consequent changes in sales methods, noncompliant lens care because of contact lenses being mistaken for disposable lenses, erroneous use of contact lenses, noncompliant lens care, problems with lens case handling and replacement, and failure to undergo periodic examinations.

Among the above-mentioned factors related to the occurrence of complications, noncompliant lens care could be overcome if SCL wearers' awareness of the importance of complete care was improved.^{10,11} According to the present survey, most of the SCL wearers performed lens care, a result that seems to be different from those reported previously.^{1,2,10,11} This is likely a result of the study design as only subjects who stated that they performed lens care at least twice a week were selected for this survey, which resulted in the high percentage of subjects performing lens care every day (94.2%).

When purchasing SCL, 57.1% of the subjects had received an explanation or guidance about including a rubbing step while cleaning their lenses at an eye clinic or CL store. Similarly, this survey found that 64.2% of the subjects included a rubbing step every time they cleaned their lenses. This is consistent with results reported by Bui et al.¹¹ The percentage of SCL wearers who clean their lenses by rubbing is likely to increase if they are given education about proper lens care.

There is considerable room for improvement with respect to the handling of lens cases. Only 49.8% of the subjects reported that they cleaned their lens case every time the lenses were worn. In addition, 61.6% of subjects reported that they replaced their case within 3 months of purchase, and 20.3% did not replace their lens case at all. Furthermore, only 17.7% of the subjects had received an explanation or guidance about replacing their lens cases.

Previous studies of contact lens wearers have indicated that it is important to educate patients about proper lens care procedures as well as the risk of complications.^{3,10–12} As reported previously, inviting comments from the public and utilizing mass media are effective for this purpose. However, it has also been reported that many contact lens wearers have not incorporated good lens care into practice, although they have learned from educational activities that noncompliant lens care is a risk factor for eye complications.^{11,13} Education regarding proper lens care should be conducted at every patient visit, regardless of whether or not problems are detected. It is also necessary to inform contact lens wearers in advance about the measures that should be taken if any abnormalities occur while wearing lenses.

It is extremely difficult to provide the necessary education or guidance to contact lens wearers who buy lenses on the internet without a doctor's prescription or even consultation with a store assistant. It is likely that the package insert will not always be read in full, if at all. In fact, there is a report that

Table 5 Subject responses to questions regarding replacement and cleaning of contact lens cases

Question asked	Response	Number (%)
Do you usually clean your lens case? If you answer "Yes," then how often do you clean it?	Every time when I do lens care	498 (49.8%)
	Once every 2–3 times of lens care	108 (10.8%)
	Once every 4–5 times of lens care	58 (5.8%)
	Once every 6–10 times of lens care	47 (4.7%)
	Less than the above	21 (2.1%)
	Never clean lens case	268 (26.8%)
	Have you ever been given an explanation or guidance about lens case cleaning?	Have been guided
Never been guided		499 (49.9%)
Do not remember		306 (30.6%)
Have you ever been given an explanation or guidance by an eye care professional or store assistant about replacing your lens cases?		Have been guided
	Never been guided	525 (52.5%)
	Do not remember	298 (29.8%)
	When do you change your lens case to a new one?	Every month
Every 2 months		236 (23.6%)
Every 3 months		258 (25.8%)
Every 4 months		37 (3.7%)
Every 5 months		15 (1.5%)
Every 6 months		102 (10.2%)
Every 7–12 months		22 (2.2%)
Every 13–24 months		4 (0.4%)
More than 24 months		0 (0.0%)
No replacement	203 (20.3%)	
When do you replace your lens case with a new one?	Upon obtaining new lens cases upon purchase of lens care solutions	375 (69.7%)
	When remarkable stains in lens cases are found	108 (20.1%)
	Upon replacement of lenses	62 (11.5%)
	When deposits on lenses are annoying	31 (5.8%)
	Upon switch to a new bottle of lens care solution	137 (25.5%)
	Others	6 (1.1%)
	No specific reason	18 (3.3%)

the percentage of contact lens wearers who forget essential items of lens care is 3.8 times higher among those buying lenses on the internet than among traditional buyers.¹⁰

The present study was based on the results of a survey of soft contact lens wearers, but not on actual ophthalmological examination. Therefore, the results may well be different from the actual incidence of ocular findings and complications. We previously compared ocular findings between SCL wearers with and without inclusion of a rubbing step during cleaning, who performed cold disinfection as lens care, and attended

Table 6 Subject responses to questions regarding recommendations for lens care procedures and products

Suggested specific instructions for use of MPS or brand	Number (%)
Only specific care instructions were suggested	87 (14.2%)
Both care instructions and brand were suggested	139 (22.7%)
Only brand was suggested	78 (12.7%)
No suggestion	173 (28.2%)
Do not remember	136 (22.2%)
Reasons for recommendation (n = 304, multiple answers)	
It is compatible with your current SCL	112 (36.8%)
To avoid trouble such as allergies	31 (10.2%)
High disinfection effectiveness	74 (24.3%)
Sensitive for your eyes	62 (20.4%)
Usable for any SCL	73 (24.0%)
Others	12 (3.9%)
No reasons provided but recommendations made	43 (14.1%)
Do not remember	48 (15.8%)

Abbreviations: MPS, multipurpose solution; SCL, soft contact lens.

the outpatient clinic of our hospital for periodic examination. As a result, the percentage of patients with asymptomatic corneal findings such as superficial punctate keratitis and corneal infiltrates was 14% in the rubbing group, while patients with corneal findings (even though mild) accounted for 50% of the non-rubbing group.¹⁴ These results indicate a pitfall in lens care, that is to say performing lens care without the inclusion of a rubbing step might lead to an increased risk of contact lens-related ocular complications. Therefore, attention should be paid to those soft contact lens wearers identified by this survey who did not perform proper lens care. These patients may be at higher risk for early ocular changes that might lead to an increase in the incidence of ocular complications.

In conclusion, this survey on lens care confirmed that soft contact lens wearers know about the importance of proper lens care, but only a small percentage of wearers perform all aspects of lens care, such as cleaning their lenses by including a rubbing step and cleaning and replacing the lens case. Education is important to encourage soft lens wearers to perform better lens care. The best method of education is direct individual guidance by an eye care professional or store assistant at the time of lens purchase or prescription and at all subsequent follow-up visits.

Disclosure

The authors report no conflict of interest in this work.

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