International Journal of Current Medical And Applied Sciences, vol.6. Issue 2, April: 2015. PP: 126-130

Efficacy of Extended Wear Contact Lenses in Indian Climatic Conditions.

Asma Farheen*, Tattayarao Lahane & Neeta S. Gawhale*****

*Consultant Ophthalmologist, ESIS Hospital, MIDC, Aurangabad.

**Dean, Grant Medical College & JJ Hospital, Mumbai, Maharashtra, India.

***Associate professor, Grant Medical College & JJ Hospital, Mumbai, Maharashtra, India

Corresponding email ID: asmaaltaf7@yahoo.com

Research Article

Subject: Ophthalmology

Abstract:

Contact lenses are considered medical devices and can be worn to correct vision, or for cosmetic or therapeutic reasons. It was estimated that 125 million people (2%) use contact lenses worldwide. Extended wear of soft contact lenses for up to 6 days has been advocated in various forms since the 1980s with traditional hydrogel lenses. However, owing to the relatively high rates of associated microbial keratitis, extended wear of soft contact lenses has not had widespread use.

Material & Methods: The present study was conducted on 50 patients of age group 15 to 45 years, in the department of Ophthalmology at tertiary health Care Centre.

Results: out of 50 patients, 10 (20.0%) & 40 (80.0%) were male & female respectively. 8% of study group were showing positive corneal staining all of them were females. Out of 8%, positive for corneal staining 4% had punctate epithelial erosions and 4% had corneal infiltrates. 6% study population had allergic conjunctivitis, out of which 10% were males and 5% were females.

Conclusion: Extended wear contact lenses has increased the tolerance and safety of extended contact lens wear, but patient instruction and education in proper use and care of lenses is required and caution is advised.

It improves comfort significantly in most environments, allowing subjects to wear them in challenging environments. Thus it can be concluded that extended wear contact lenses are efficacious in Indian climatic conditions.

Key Words: Contact Lenses, Staining, hydrogel lenses.

Introduction:

An extended wear [EW] contact lens is designed for continuous overnight wear, typically for 6 or more consecutive nights. Newer materials, such as silicone hydrogels, allow for even longer wear periods of up to 30 consecutive nights; these longer-wear lenses are often referred to as continuous wear [CW]. Generally, extended wear lenses are discarded after the specified length of time. These are increasing in popularity, due to their obvious convenience. Extended- and continuous wear contact lenses can be worn for such long periods of time because of their high oxygen permeability (typically 5-6 times greater than conventional soft lenses), which allows the eye to remain healthy [1].

Extended wear of soft contact lenses for up to 6 days has been advocated in various forms since the 1980s with traditional hydrogel lenses. However, owing to the relatively high rates of associated microbial keratitis, extended wear of soft contact lenses has not had widespread use [2,3].

The advent of high oxygen permeability silicone hydrogel soft contact lenses has again made extended wear a viable option, as the increased oxygen permeability is thought to reduce the risk of development of a hypoxic epithelial defect, which can serve as a portal of infection [4].

The wearing of contact lenses has increased dramatically in the past decade; over 4 million people in the United States now use extended-wear soft contact lenses, and 9 million use daily-wear soft contact lenses [5].

Recently introduced silicone hydrogen SCL have much higher oxygen transmissibility ($Dk/t\ O_2$), allowing near normal oxygen supply to the cornea during extended lid closure, and are hoped to address most of the problems related to corneal hypoxia encountered with previous entended wear soft contact lenses.

There are a number of reasons for considering a day and night wearing modality. In addition to those patients simply desiring convenience, a group of obvious candidates for EW and CW are patients with high refractive errors who may be vulnerable as a consequence of their unaided visual performance. These patients could benefit enormously from being able to see clearly at all times, particularly when making unexpectedly during the night. Other prospective patients include those who have an active lifestyle or occupation in which spectacle wear is

hazardous or impractical but who may require visual correction at all times of the day and night. This could include members of the emergency workforce working on shifts or with unpredictable hours and schedules [6]. Extended wear Contact Lenses can be successfully worn in all climatic conditions in all parts of the world. Use of extended wear silicone hydrogel lenses improved comfort significantly in most environments, allowing subjects to wear them in challenging environments [7]. And even within India, the climatic conditions vary a lot a lot; so it would not be good to generalize a statement from one city and apply it to the whole country.

So this study is an attempt to see whether extended wear contact lenses are efficacious in Indian climatic conditions or not?

Aim & Objectives:

- To find out the prevalence of complications of extended wear contact lenses in patients between the age group of 15 to 45 years wearing extended wear contact lenses.
- To find out the prevalence of dry eyes in extended wear contact lens wearers.

Material & Methods:

The present study was conducted on 50 patients of age group 15 to 45 years, in the department of Ophthalmology at tertiary health Care Centre.

Selection of Patients:

- The Patients wearing extended wear contact lenses for minimum duration of one month.
- Patients wearing only extended wear contact lenses.
- Patients with best corrected visual acuities of 6/6 or 6/9.

Exclusion Criteria:

- Previously diagnosed or treated for keratitis.
- Patients diagnosed or treated for dry eyes in past.
- Patients diagnosed or treated for allergic conjunctivitis.
- Patients with corneal vascularization.
- Use of ocular medication like steroid.

Plan of Study:

Total 50 cases were examined in OPD, detailed history was taken and they were asked to fill up 12 points questionnaire related to complications of extended wear contact lenses use.

Thorough ocular examination comprising of visual acuity, torch examination, and slit lamp examination was done with and without contact lenses.

Patients were followed-up on monthly basis for six months. During each visit, complete ophthalmic evaluation was done to detect complications.

Specific Test:

Staining: A fluorescein strip touched to the surface of eye. Patient was asked to blink. Blinking spreads the dye around and coats the tear film covering the surface of the cornea.

A blue light of slit lamp is then directed at patient's eye. Any problems on the surface of the cornea will be stained by the dye and appear green under the blue light.

Abnormal Results:

- Abnormal tear production (dry eye)
- Corneal abrasion (a scratch on the surface of the cornea)
- Foreign bodies, such as eyelashes or dust
- Infection
- Injury or trauma.

Tear Film Break Up Time: The tear film break-up time is defined as the interval between the last complete blink and the first appearance of a dry spot or disruption in the tear film. It is used to measure quality of tear film.

Schirmer's Test: Schirmer's test determines whether the eye produces enough tears to keep it moist.

Observation & Results:

Table 1: Gender wise Distribution of Patients:

Gender	No. of patients	percentage
Male	10	20.0%
Female	40	80.0%
Total	50	100%

Out of 50 patients, 10(20.0%) & 40(80.0%) were male & female respectively.

Table 2: Prevalence of Allergic conjunctivitis, Corneal Infiltrates, Corneal Staining , punctate Epithelial Erosions , Giant Papillary Conjunctivitis:

	Male (n =10)		Female (n =40)		Total (n =50)	
	No.	Prevalence	No.	Prevalence	No.	Prevalence
Allergic conjunctivitis	1	10%	2	05%	3	06%
Corneal Infiltrates	0	00%	2	05%	2	04%
corneal Staining	0	00%	4	10%	4	08%
Punctate Epithelial Erosions	0	00%	2	05%	2	04%
Giant Papillary Conjunctivitis	1	10%	0	00%	1	02%

Note: No patient found in Dry eyes & Microbial keratitis.

8% of study group were showing positive corneal staining all of them were females. Out of 8%, positive for corneal staining 4% had punctate epithelial erosions and 4% had corneal infiltrates. 6% study population had allergic conjunctivitis, out of which 10% were males and 5% were females. 5% patients having corneal infiltrates were females. 5% patients having punctate epithelial erosions were females.

Table: 3: Symptoms in patients:

Symptoms	No. of cases	Percentage
Gritty sensation	**5**	**10%**
Redness	**3**	**06%**
Tiredness	**3**	**06%**
Pain	**2**	**04%**
Photophobia	**2**	**04%**
stickiness	**2**	**04%**
Burning	**3**	**06%**
Watering	**3**	**06%**
Itching	**5**	**10%**

The above shows most common complaints were gritty sensation and itching in 10% of patients each, followed by redness, Tiredness, burning, watering in 6 % of patients each, then are the pain, Photophobia, stickiness in 4% of patients each.

Discussion:

Living in an era with all types of advanced technology, one of the global megatrends is convenience. A growing number of contact lens wearers want to safely sleep in their contact lenses longer. So introduction of highly oxygen-transmissible silicone hydro gel and gas permeable contact lenses represents a major breakthrough in satisfying corneal requirements for successful continuous wear.

Extended wear Contact Lenses can be successfully worn in all climatic conditions in all parts of the world. And even within India, the Climatic conditions vary a lot a lot; so it would not be good to generalize a Statement from one city and apply it to the whole country.

The "Indian" factors to be considered are poor health care awareness and high environment pollution levels. Also due to economic reasons, many patients tend to prolong/stretch the use of contact lenses and even lens care solutions. Such non-compliance leads to increased contact lens deposits, spoilage and eventually discomfort. Most patients without realizing these factors -simply blame the lens not being suitable for "Indian" conditions.

In present study, the overall prevalence of complication was 16% including 6% cases of allergic conjunctivitis, corneal infiltrates 4%, punctuate epithelial erosions 4%, giant papillary conjunctivitis 2% dry eyes 0% and microbial keratitis 0%.

Our study result of 6 % cases of allergic conjunctivitis matches to that of 6.4 % done by Sankaridurg PR et al [8].

Nilsson SE et al [9] reported prevalence of 3% GPC and Bergenske P et al [10] shows 7 % GPC rate with EWCL use which are higher than our result of 2%. Sartkaridurg PR et al [8] in 2003 found GPC prevalence of 1% which is lower than present study observations.

Present study had 4% prevalence of corneal infiltrates which is more than that of the studies done by Nilsson SE et al [09] 2.3%; Chalmers RL et [12] 2.6%, Buckley CA et al 2.5% and Efron N. et al 1.16%.

There are studies reporting higher prevalence rates as compared to present study, they are 8.9% by Sankaridurg PR et al [11] 9.33 % by Aakre BM et al [15] 14.4o/o by Szczotka -Flynn et al [16].

Present study showed prevalence of punctate epithelial erosions 4%, which is nearly matching to that of 4.3 % Sankaridaug PR et al [8].

Overall, there is an eight times higher incidence of CIEs in wearers who sleep in contact lenses compared with wearers who use lenses only during the waking hours.

We found 8% patients had corneal staining. It is higher than that of 4% reported by Bergenske P et al [10] in 2007 and lower than 10.5% reported by Nission SE et al [9] .

Increased use of silicone hydrogel contact lenses has necessitated a parallel rise in the use of multipurpose care solutions [MPS]. This in turn has been accompanied by substantially more reports of solution related complications, in particular corneal staining and low grade infiltrates. Management of these problems involves reducing the impact of care system components on the ocular surface. Options for achieving this include use of low impact lens/MPS combinations, daily disposable lenses or hydrogen peroxide based disinfection systems.[17].

We did not find dry eye Symptoms in any of our patients. In fact literature, Schafer J et al [18], Russo PA et al [19], Chalmers RL et al [20] suggested silicone hydro gel lenses reduced the frequency and severity of

dryness symptoms seen with hydrogel lens wear for many subjects and can improve subjective dry eye Symptoms and visual acuity in patients with refractory dry eye disease.

Chalmers RL et al [21] found Continuous wear of high Dk silicone hydrogel lenses resulted in an improvement in ocular redness and dryness symptoms [20].

Riley C et al (2005) [22] and Ouster GW et al (2008) [23] showed that symptoms and ocular surface staining associated with contact lens related dryness can be significantly alleviated by the use of extended wear Contact lens (hioxofilcon A).

In our study there was no case of microbial keratitis and result match to that done by Sankaridurg P R et al [11] and Nilsson S E et al [9].

Wilcox MDP et al (2001) [24] and. Bruinsma GM et al (2002) [25] showed that non-compliance with contact lens care and hygiene may result in their contamination predisposing the eye to infections.

Morgan PB et al (2005) [26] and Yamane S et al (1991) [27] found that there are a number of individuals who are associated with a higher risk of infection and inflammation with extended wear contact lens wear. These include those individuals who are new to the overnight wearing modality, have a higher refractive error (> 5.00D), males, both young (25 years) and older (> 5O years) wearers. In addition to the increased risk associated with the overnight wearing modality, a number of actions or behaviors have also been associated with greater risk including swimming without goggles (or not disinfecting lenses after swimming in them), use while on vacation, inappropriate hand washing, poor hygiene, internet purchase and smoking.

Weissman BA et al (2002) [28] added additional risk factors like blepharitis, diabetes mellitus, epithelial trauma, steroid use, therapeutic lens use, tobacco use, and possibly travel to warm climates.

Patients may be more prone to experiencing adverse events, when they are physically unwell and should be advised to remove their EWCL during these times.

Holden BA et al (2005) [29] reported 0.32% Schein OD et al (2005) [30] 0.18 %, Buckley CA et al [13] 0.2 and Cheng KH et al (1999) [3] found 0.2% of microbial keratitis in extended wear contact lens use.

Climatic conditions play a role in disease severity and causative organism in contact lens-related microbial keratitis. Severe contact lens-related microbial keratitis was more likely to occur in warmer, humid regions of the country [31].

Willcox MD (2O07) [86] suggested minimizing bacterial adhesion to and colonization of contact lenses were considered the only viable preventative strategies in reducing incidence rate.

The mechanisms that are being trialed include alternative disinfecting systems in contact lens cleaning and disinfecting multipurpose solutions and silver-containing contact lens cases that have been reported to reduce bacterial colonization of cases. Other strategies for prevention of bacterial colonization are the use of the antimicrobial agent's silver, chitosan, polyquats, cationic peptides, furanones, and selenium.

Although, many strategies are being investigated, to date there are no published studies examining the effectiveness of any of these strategies to reduce the rate of microbial Keratitis.

Prevention of Complications:

Extended wear Content lenses associated complications can be prevented by the following measures:

- Appropriate choice and fitting of EWCLs is essential when prescribing them.
- Appropriate care of each type of lens is important.
- Regular check-ups and improved compliance with proper lens care by EWCL users is important.
- Ophthalmologists and allied medical personnel who prescribe EWCLs need to understand proper lens care and proper handling and disinfection of trial lenses is crucial. Those who prescribe EWCLs must be aware of and know how to decrease the risk of infection associated with EWCL use and must provide EWCL users with the information they need to be able to wear their lenses safely and comfortably.

Conclusion:

Individualized approach should be followed in determining the best extended wear contact lenses and wearing schedule for each patient. For all the cases the relevant risk factors should be assessed and patients should be counseled appropriately. Extended wear contact lens can be used in dry eye symptoms. Compliance with extended wear contact lens care, hygiene and regular Check-ups are keys to best outcome. Extended wear contact lenses has increased the tolerance and safety of extended contact lens wear, but patient instruction and education in proper use and care of lenses is required and caution is advised. It improves comfort significantly in most environments, allowing subjects to wear them in challenging environments. Thus it can be concluded that extended wear contact lenses are efficacious in Indian climatic conditions.

References:

1. Barr J. 2O04 Annual Report. Contact Lens Spectrum. January 2005.
2. Stapleton F, Dart JKG, Minassian D. Risk factors with contact lens related suppurative keratitis. CLAO J. 1993;19 :204-210.

3. Cheng KH, Leung SL, Hoekrnan HW, et at. Incidence of contact lens-associated microbial keratitis and its related morbidity. Lancet. 1999;354:181-185.
4. Keay L, Willcox MDP, Sweeney DF, et al. Bacterial populations on 3o-night extended wear silicone hydrogel lenses. CLAO J. 2001:27 :30-34.
5. Poggio EC, Glynn R.I, Schein OD, Seddon JM, Shannon MJ' Scardino VA, and Kenyon KR. The incidence of ulcerative keratitis among users of daily-wear and extended-wear soft contact lenses. N Engl J Med. 1989 Sept; 321(12) :779-783.
6. De Carle J. Extended wear lenses gaining ground. Contact Lens Forum. 1979; 4 :31-41.
7. Young G, Riley CM, Chalmers RL, Hunt C. Hydrogel lens comfort in challenging environments and the effect of refitting with silicone hydrogel lenses. Optom vis SCi 20o7 April; 84(4): 302-308.
8. Sankaridurg PR, Sweeney DF, Sharma S, Gora R, Naduvilath T, Ramachandra. Adverse events with extended wear of disposable hydrogels: results for the first 13 months of lens wear. Ophthalmology. 1999 Sep; 106(9):1671-1680.
9. Nilsson SE. Seven-day extended wear and 30-day continuous wear of high oxygen transmissibility soft silicone hydrogel contact lenses: a randomized 1-year study of 504 patients. CLAO J. 2001:27(3): 125-136.
10. Bergenske P, Iong B, Dillehay S, Barr JT, Donshik P, Secor G, Yoakum J, Chalmers RL. Long-term clinical results: 3 years of up to 30-night continuous wear of lotrafilcon A silicone hydrogel and daily wear of low-Dk/t hydrogel lenses. Eye Cortact Lense, 2OO2 Mar; 33(2) : 74-8O.
11. Sankaridurg PR, Sweeney DF, Holden BA" Nadrrtrilath T, Velala I, Gora R, Krishna Machar M, Rao GN. Comparison of adverse events with daily disposable hydrogels and spectacle wear: results from a 12-month prospective clinical trial Ophthalmology 2OO3; 110(12) : 2327-2334.
12. Chalmers RL, McNally JJ, Schein OD ,Katz J, Tielsch JM, Alfonso E, Bullimore M, O'Day D, Shovlin J, Risk factors for corneal infiltrates with continuous wear of contact lenses. Optom Vis ScL 2OO7 Jul; 84(7) :573-579.
13. Buckley, C.A, Buckley C.J, Griffiths, J. Extended wear disposable soft contact lenses as an alternative to photorefractive keratectomy (report of 4 years experience) . Aust N Z J Ophthalmol. 1997;25:111–116.
14. Efron N, Morgan PB, Hill EA, Raynor MK, Tullo AB. Incidence and morbidity of hospital-presenting corneal infiltrative events associated with contact lens wear. Ctin Exp Optom- 2OO5 ; 88(4) : 232-239.
15. Aakre BM, Ystenaes AE, Doughty MJ, Austrheim O, Wester B, LieMT. Ophthalmic Phgstol Opt. 2OO4 Mar; 24(2) : 130-141.
16. Szczotka-Flynn L, Diaz M. Risk of corneal inflammatory events with silicone hydrogel and low DK hydrogel extended contact lens wear: a meta-analysis. Optom Vis Sci. 2007; 84:247–256.
17. Papas EB, Carnt N, Willcox MD, Holden BA. Complications associated with care product use during silicone daily wear of hydrogel contact lens. Eye Contact Lens. 2007;33 :392–393.
18. Schafer J, Mitchell GL, Chalmers RL, Long B, Dillehay S, Barr J, Bergenske P, Donshik P, Secor G, Yoakum J. Eye Contact Lens. 2OO7 Sep; 33(5) : 247.
19. Russo PA, Bouchard CS, Galasso JM., Extended-wear silicone hydrogel soft contact lenses in the management of moderate to severe dry eye signs and symptoms secondary to graft-versus-host disease. Eye Contact Lens. 2007 , May;33 (3):144-7
20. Chalmers RL, Long B, Dillehay S, Begley C. Improving Contact-Lens Related Dryness Symptoms with Silicone Hydrogel Lenses Optom Vis Sci, 2OO8 Aug; 85(8) : 778-784.
21. Chalmers RL, Dillehay S, Long B, Barr JT, Bergenske P, Donshik P, Secor G, Yoakum J. Impact of previous extended and daily wear schedules on signs and symptoms with high Dk lotrafilcon A lenses. Optom Vis Sci.2005; 82:549–54.
22. Riley C, Chalmers RL, Pence N. The impact of lens choice in the relief of contact lens related symptoms and ocular surface findings. Contact Lens Anterior Eye. 2005 Mar; 28(1):13-9.
23. Ousler, GW, Anderson RT, Osborn KE. The effect of senofilcon A contact lenses compared to habitual contact lenses on ocular discomfort during exposure to a controlled adverse environment. Current Medical Research and Opinion, 2008 , 24(2):335-341.
24. Willcox MDP, Harmis N, Cowell BA, Williams T, Holden BA Bacterial interactions with contact lenses; effects of lens material, lens wear and microbial physiology. Biomaterials.2001:22:3235-3247.
25. Bruinsma GM, Rustema- Abbing M, de Vries J, Stegenga B, Mei HC van der, Linden ML van der, Hooyrmans JM, Busscher HJ. Influence of wear and over-wear on surface properties of etafilcon A contact lenses and adhesion of Pseudomonas aeruginosa. Invest Ophthalmol Vis Sci. 2OO2; 43 : 3646-3653.
26. Morgan PB, Efron N, Brennan NA, Hill EA, Raynor MK, Tullo AB. Risk factors for the development of corneal infiltrative events associated with contact lens wear. Invest Ophthalmol Vis Sci. 2OO5; 46 : 3136-3143.
27. Yamane S, Paragina S. Patient education. In: Bennett ES, Weissman BA, Clinical Contact Lens Practice. Philadelphia: Lippincott, 1991: 59-1 to 59-9.
28. Weissman BA, Mondino BJ. Risk factors for contact lens associated microbial keratitis. Contact lens Anterior Eye .2OO2Mar; 25 (1), 3-9.
29. Holden BA, Sankaridurg PR Sweeney DF, Stretton S, Naduvilath TJ, Rao GN. Microbial keratitis in prospective studies of extended wear with disposable hydrogel contact lenses. Cornea- 2OO5 Mar; 24(2) : 156-61.
30. Schein OD, McNally JJ, Katz J, Chalmers RL, Tielsch JM, Alfonso E, Bullimore M, O'Day D, Shovlin J. The incidence of microbial keratitis among wearers of a 30-day silicone hydrogel extended-wear contact lens. Ophthalmology .2005; 112(12) : 2172-2179.
31. Stapleton Fiona, Keay Lisa J, Sanfilippo Paul G, Katryar Suchi, Edwards Katie P, Naduvilath Thomas. Am J Ophthalmology, 2002, 44(5): 690-698.
32. Willcox MD. New strategies to prevent Pseudomonas keratitis. Eye Contact Lens.2007; 33: 401–403.
