

OCULAR SURFACE INFLAMMATION BETWEEN DAILY WEAR AND EXTENDED WEAR SOFT CONTACT LENSES

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Table 1. Demographic distribution based on baseline characteristics (n=52)

Subject Characteristic	Frequency	Percentage (%)
Gender		
Male	10	19,2
Female	42	80,8
Age Group		
19 – 25 Years Old	52	100,0
Mean ± SD Age (Years)	22,12±1,79	
Eye side		
Nefilcon A		
Right	31	59,6
Left	21	40,4
Lotrafilcon B		
Right	21	40,4
Left	31	59,6

Table 2. Clinical characteristics data according to SCL types (n=52)

Parameter	Nefilcon A	Lotrafilcon B	P value
	Mean / Med (SD / Range)	Mean / Med (SD / Range)	
UCVA*	0,40 (0,02 - 0,86)	0,50 (0,03 - 0,86)	0,386
Spher*	-1,25 (-6,00 - -0,50)	-1,00 (-6,00 - -0,50)	0,169
Cyl*	-0,25(-1,25 - 0,00)	-0,25 (-1,25 - 0,00)	0,399
SCL*	-1,25 (-6,00 - -0,50)	-1,00 (-6,00 - -0,50)	0,059
K1	42,93 (± 1,27)	42,92 (± 1,23)	0,697
K2	44,03 (± 1,23)	44,08 (± 1,22)	0,364
IL-6 pre*	1,24 (0,04 - 160,10)	0,95 (0,04 - 171,02)	0,695
NIBUT	14,70 (± 3,72)	16,76 (± 5,05)	0,001

SCL: Soft Contact Lenses; UCVA: Uncorrected Visual Acuity; K1: Horizontal Keratometry; K2: Vertical Keratometry; IL-6: Interleukin-6; NIBUT: Non-Invasive Break Up Time; The p value is significant if <0.050; Normal distribution: Dependent t-test * Wilcoxon rank test

Table 3. IL-6 based on SCL types (n=50)

	Nefilcon A	Lotrafilcon B	
Parameter	Median (Range)	Median (Range)	P value
IL-6 pre	1,24 (0,04 - 160,10)	0,95 (0,04 - 171,02)	0,695
IL-6 post	5,97 (0,07 - 698,95)	12,66 (0,11 - 1118,59)	0,101
Delta IL-6	4,46 (0,01 – 685,40)	6,37 (0,05 – 1115,8)	0,117

BACKGROUND

The increasing number of myopia patient in the world, causes growth of Soft Contact Lenses (SCL) users. SCL usage has proven to increase cytokine production, especially Interleukin-6 (IL-6) which will leads to inflammation of the ocular surface such as conjunctival hyperemia.

OBJECTIVE

Evaluating IL-6 tear levels and their correlation with conjunctival inflammation scale between overnight wear silicone hydrogel SCL and daily wear hydrogel SCL.

METHODS

This study is a randomized controlled trial between two parallel groups. A myopia subject, who has never used SCL before, being treated using daily Hydrogel (Nefilcon-A) SCL in one eye, and overnight Silicone Hydrogel (Lotrafilcon-B) SCL in the other eye, for 14 days. The slit lamp examination, conjunctival photographs, and tear sampling for IL-6 were done before and 14 days after SCL usage.

RESULTS

One hundred and four eyes from 52 patients were included in this study. Of those patients, 80,8% were female and 18,2% male with mean age $22,18 \pm 1,79$ years old. Median of IL-6 delta (pre-post) SCL usage was 6,37 (0,05 – 1115,80) pg / mL for Lotrafilcon-B and 4,46 (0,01 - 685,40) pg / mL for Nefilcon-A ($p = 0,117$). There were no significant difference between the initial and final conjunctival hyperemia scales in both groups ($p=1,000$). The correlation between IL-6 tear levels and conjunctival hyperemia was not significant ($p = 0.234$).

CONCLUSION

There were a significant increase of IL-6 tear levels after 14 days of SCL usage in both groups. However, giving the appropriate use of the SCL, the marked escalation of tear IL-6 levels was not accompanied by conjunctival hyperemia.

Table 4. Correlation between conjunctival bulbar inflammation and changes in IL-6 levels.

Efron	Nefilcon A		Lotrafilcon B		P value
	n	Median (Range)	n	Median (Range)	
(1)	9	0,38 (0,02 - 685,40)	10	4,61 (0,06 - 230,30)	0,243
(2)	40	4,60 (0,01 - 120,46)	36	5,61 (0,05 - 1115,80)	0,905
(3)**	1	8,48 (8,48 - 8,48)	4	15,7 (2,45 - 29,77)	—

Note: Mann Whitney rank. * * **Not tested**

Table 5. Correlation between conjunctival limbal inflammation and changes in IL-6 levels.

Efron	Nefikon A		Lotraficon B		P value
	n	Median (Range)	n	Median (Range)	
(0)	1	0,13 (0,13 - 0,13)	0	—	—
(1)	46	4,46 (0,01 - 685,40)	47	7,03 (0,05 - 1115,8)	0,424
(2) **	3	26,5 (0,05 - 120,46)	2	1,35 (0,83 - 1,87)	—
(3) **	0	—	1	29,8 (29,8 - 29,8)	—

Note: Mann Whitney rank. * * **Not**

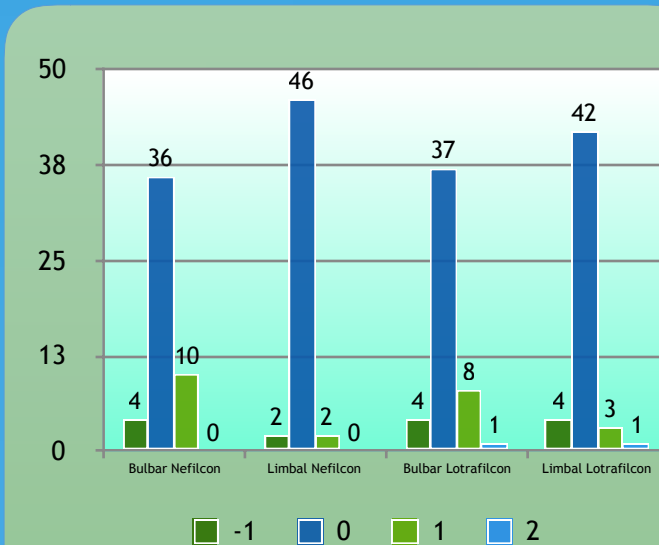


Figure 1. Changes in the degree of conjunctival inflammation before and after daily use of Neflcon A LKL and weekly use of Lotrafilcon B. LKL Degrees -1; One degree down, 0; Fixed, 1; Increases by 1 degree, 2; Increase by 2 degrees.

REFERENCES

1. Seang-Mei Saw, Gus Gazzard, David Koh, Mohamed Farook, Daniel Widjaja, Jeanette Lee, Donald T. H. Tan; Prevalence Rates of Refractive Errors in Sumatra, Indonesia. *Invest. Ophthalmol. Vis. Sci.* 2002;43(10):3174-3180.
2. Tighe BJ. A decade of silicone hydrogel development: Surface properties, mechanical properties, and ocular compatibility. *Eye Contact Lens* 2013;39:4-12.
3. Jones L, Subbaraman L, Rogers R, et al. Surface treatment, wetting and modulus of silicone hydrogels. *Optician* 2006;232:28-34.
4. Cheung SW, Cho P, Chan B. A comparative study of biweekly disposable contact lenses: Silicone hydrogel versus hydrogel. *Clin Exp Optom* 2007;90:124-131.
5. Holden BA, Fricke TR, Wilson DA, Jong M, Naidoo KS, Sankaridurg P, Wong TY, Naduvilath TJ, Resnikoff S. Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050. *Ophthalmology* 2016:1-7.
6. Nairn AJ, Jiang T-B. Measurement of the friction and lubricity properties of contact lenses. Proceedings of ANTEC, Boston, 7-11 May 1995, pp 1-5.
7. Jacob JT. Biocompatibility in the Development of Silicone-Hydrogel Lenses. *Eye & Contact Lens*. 2013;39: 13-19.
8. Dogru M, Ward SK, Wakamatsu T, et al. The effects of 2 week senofilcon-A silicone hydrogel contact lens daily wear on tear functions and ocular surface health status. *Contact Lens Ant Eye*. 2011;34:77-82.
9. Poyraz C, Irkeç M, Mocan MC. Elevated tear interleukin-6 and interleukin-8 levels associated with silicone hydrogel and conventional hydrogel contact lens wear. *Eye Contact Lens*. 2012;38: 146-149.
10. Schultz CL, Kuerst KS. Interleukin-6 levels in tears of contact lens wearers. *J Interferon Cytokine Res*. 2000;20:309-310.

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