

# EFFECTS OF THREE DIFFERENT DAILY DISPOSABLE CONTACT LENSES ON TEAR CHARACTERISTICS

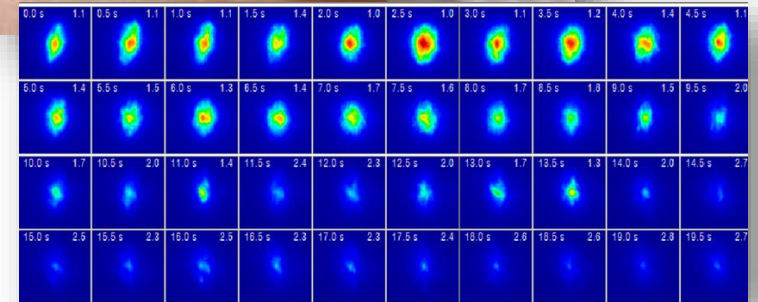
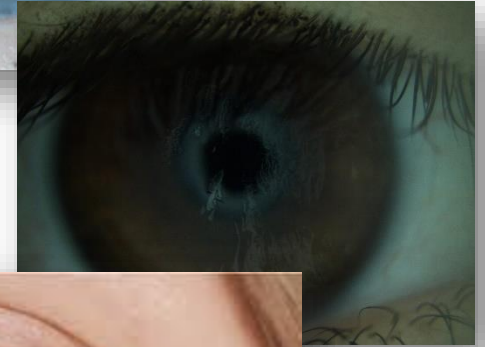
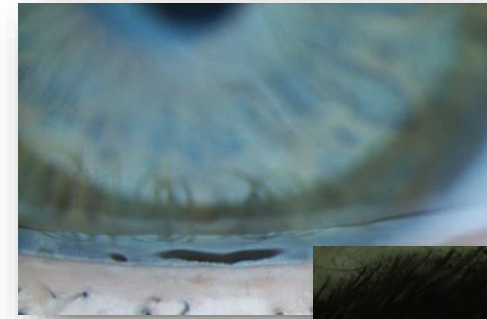
- Giancarlo Montani DipOptom FIACLE, FBCLA Università del Salento
- Fabio Carta DipOptom, Bausch+Lomb
- Maria Rosaria Mollo, Bausch+Lomb



# Purpose

Contact lens wear have a potential to alter the integrity and stability of the tear, which in turn affect quality of vision. The aim of the study was to evaluate changes induced by three different daily disposable contact lenses on tear meniscus height (TMH), pre lens tear film stability (PLTFS), tear osmolarity (TO), and objective quality of vision.

Thai LC, Tomlinson A, Ridder WH. Contact lens drying and visual performance: the vision cycle with contact lenses. *Optom Vis Sci.* 2002 Jun;79(6):381-8.  
Ettly Bitton, Lyndon Jones Influence of the blink interval on tear meniscus height in soft contact lens and nonlens wearers. *Eye Contact Lens.* 2010 May;36(3):156-63  
Iskeleli G, Karakoc Yet al., Comparison of the effects of first and second generation silicone hydrogel contact lens wear on tear film *Int J Ophthalmol.* 2013 Oct 18;6(5):666-70  
Stahl U, Willcox MD, Naduvilath T, Stapleton F. Influence of tear film and contact lens osmolality on ocular comfort in contact lens wear. *Optom Vis Sci.* 2009 Jul;86(7):857-67



# Methods

Forty-six subjects (new or CI wearers after a wash out period of three days) were enrolled for this open label randomized cross-over study. Their tear characteristics, similar in both eyes, were: NIBUT >10sec, TMH >0,18 mm and TFO <316mOsmol/L. Subjects were asked to wear for the first week of the study a CI in nesofilcon A always on the same eye (RE) and another one in delefilcon A on the fellow one. After three days of wash out it started the second week of the study with CI in nesofilcon A now in LE, and CI in stenfilcon A in RE.

Characteristics of contact lenses used for the study								
Lens type	Material	% H <sub>2</sub> O	Dk	Dk/t	Modulus	tc	BC	TD
Biotrue ONE day	Nesofilcon A	78%	42	42	0,49	0,10	8,6	14,2
Total1	Delefilcon A	33% 80%	140	156	0,7	0,09	8,5	14,1
MyDay	Stenfilcon A	54%	80	100	0,4	0,08	8,4	14,2



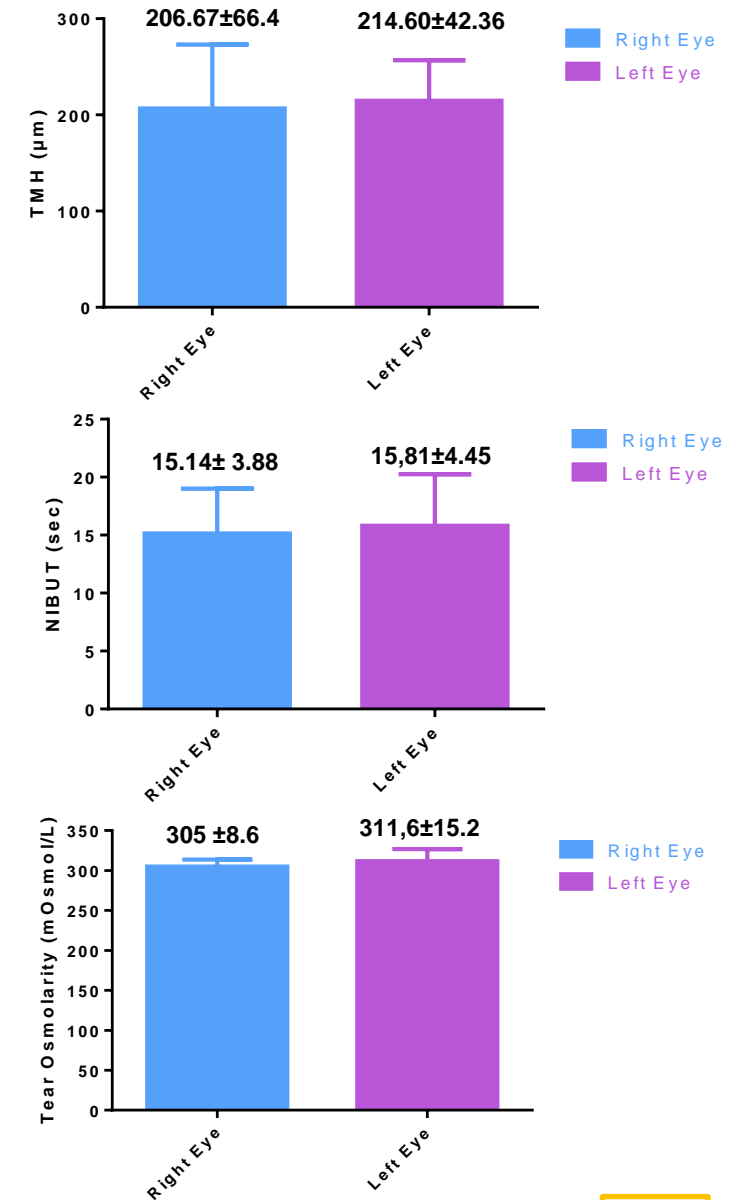
# Methods

Exams were performed at day 0 and for each CI combination at day 1 after 20 min and at day 7 after a minimum of 8 h of lens wear using always the same sequence (TMH, NIBUT or PLTFS, TO and objective quality of vision). During every session TMH was evaluated using a slit lamp-adapted FD OCT, NIBUT and PLTFS were measured with Easytearsview+ and TFO was evaluated with TearLab. Objective quality of vision was measured by means of Objective Scatter Index (OSI) for a period of 20 sec after a blink using a double pass instrument. The OSI is an *objective* evaluation of the *scattering* degree and an increase of its values is associated to reduced quality of vision.



# Results

As the data was normally distributed, ANOVA was used to assess the differences in tear characteristics during different visits. Differences between the eyes at day 0 were evaluated using t-test. A p-value  $<0.05$  was taken to indicate significance. The differences in TMH, NIBUT and TO between both eyes were not statistically significant so we assumed that, apart from the different lens type, any other factors affected both eyes equally.

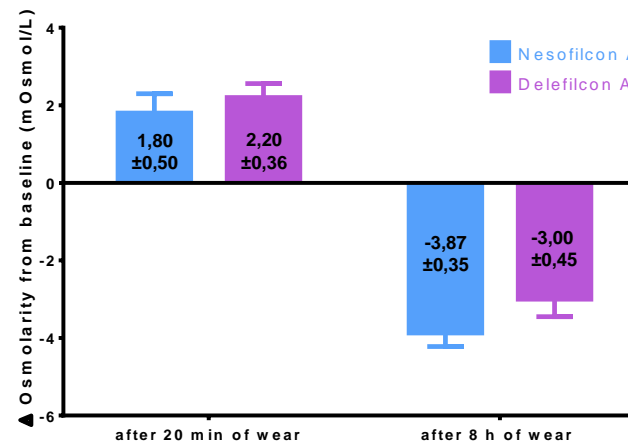
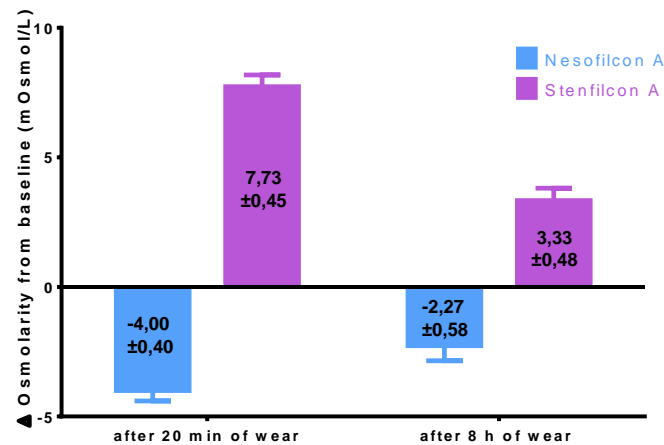


# Results

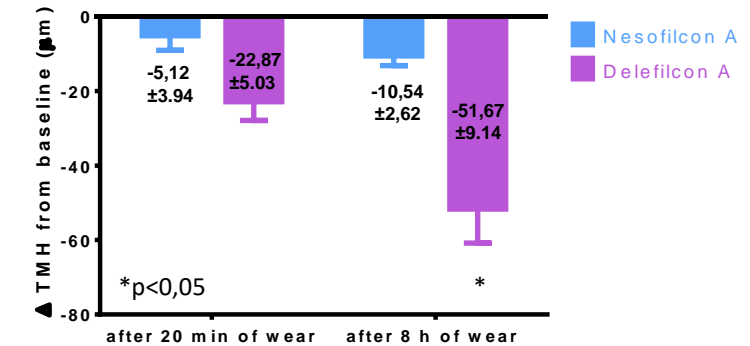
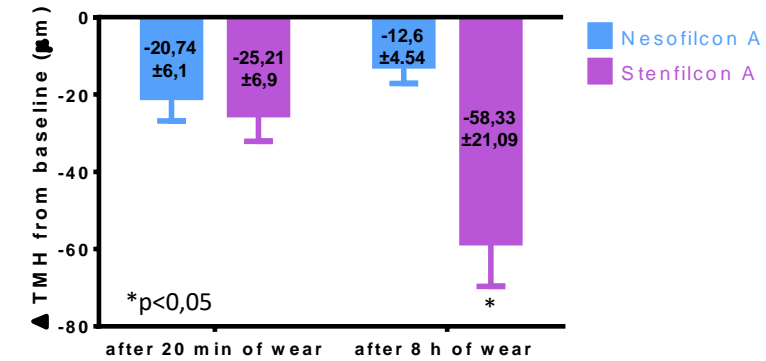
In respect to no lens condition TMH was significantly reduced just at 8h with delfilcon A and stenfilcon A but not with nesofilcon A lenses.

Despite the changes of TMH TO not changed significantly.

Δ Osmolarity obtained from measurement done after 20 min and 8h in respect to baseline



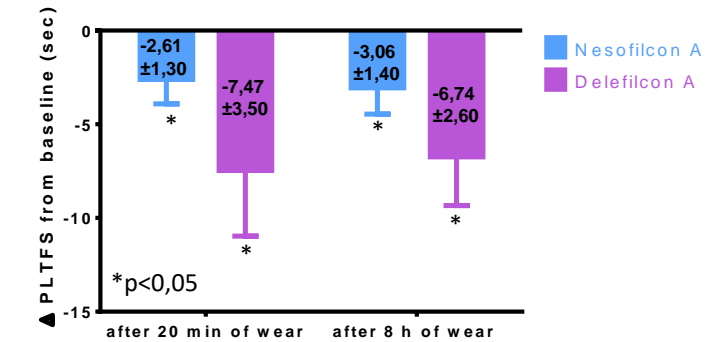
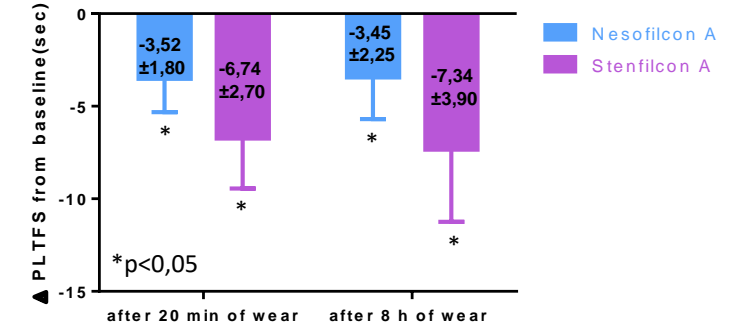
Δ TMH obtained from measurement done after 20 min and 8h in respect to baseline



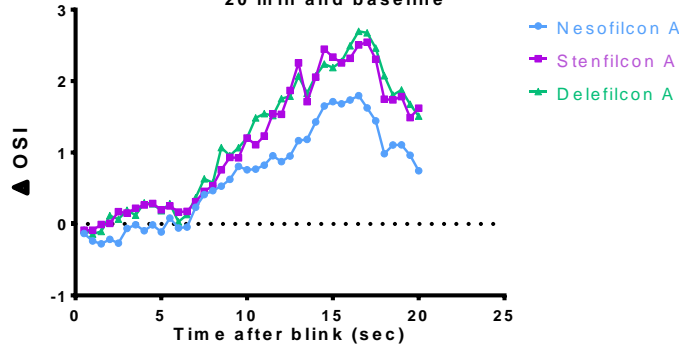
# Results

PLTFS in respect to NIBUT was significantly reduced for all lenses tested at every visit; although nesofilcon A CIs presented lower reduction of PLTFS in respect of stenfilcon A and delefilcon CIs. To compare OSI results between groups all values were normalized. Also for OSI nesofilcon A lenses in respect to the other lenses tested presented a lower increase of OSI after blink and a lower difference between measurements at 20min and 8h.

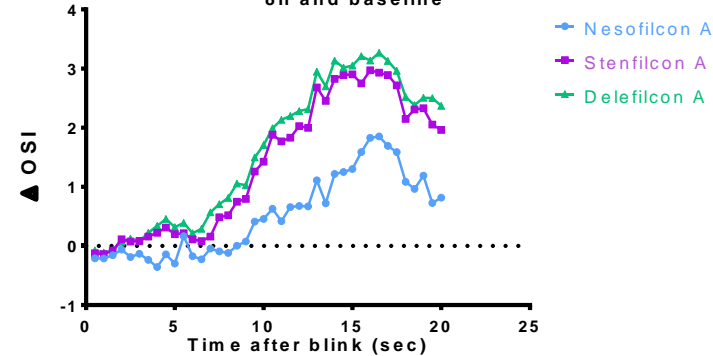
▲ PLTFS obtained from measurement done after 20 min and 8h in respect to baseline



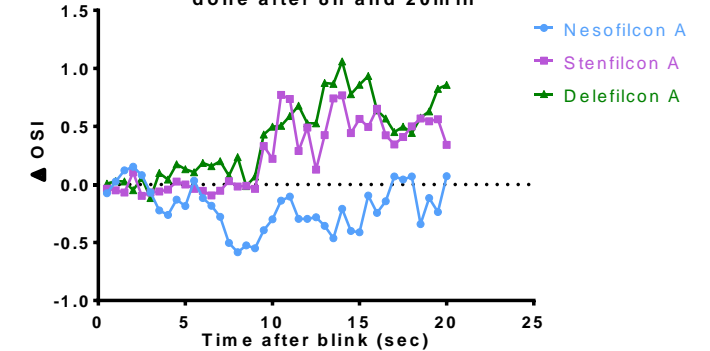
▲ OSI obtained from measurement done after 20 min and baseline



▲ OSI obtained from measurement done after 8h and baseline

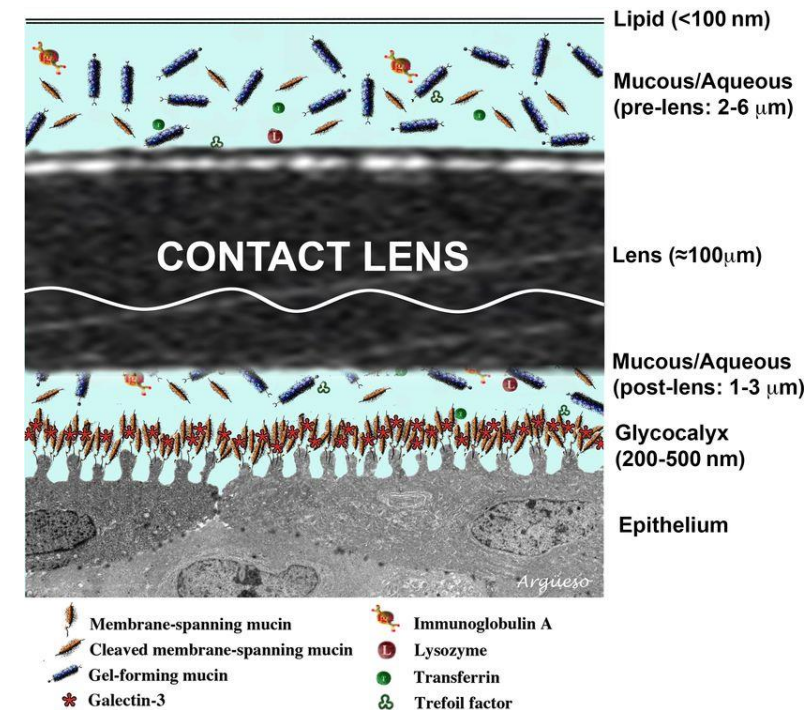


▲ OSI obtained from measurement done after 8h and 20min



# Conclusion

All CLs reduced PLTF in respect to NIBUT despite this effect was lower with nesofilcon A material. The evaluation of objective quality of vision showed its progressive reduction after blink with all CLs tested. Although nesofilcon A CLs introduce the lower reduction and maintain a more stable effect with the hours of wear. About the effect on TMH significant changes were measured with delefilcon A and stenfilcon A CLs after 8 h, although this reduction had not significant effect on TO. In conclusion nesofilcon A lenses present the lower interaction with tear in respect to other DD CLs tested.



From: Craig JP et al. The TFOS International Workshop on Contact Lens Discomfort: report of the contact lens interactions with the tear film subcommittee. IOVS. 2013 Oct 18;54(11):123-56.

