



THE EFFECT OF CONTACT LENS ON TEAR OSMOLARITY DEPENDS ON THE TEAR OSMOLARITY ITSELF



Alessandro Fossetti^{1,2}, Francesco Cozza¹, Carlo Falleni^{1,4}, Alessandro Farini^{1,3}, Jacopo Siroki¹

Istituto Regionale Studi Ottici e Optometrici (IRSOO)¹, Vinci, Italy; Università degli Studi di Firenze², Italy; INO - CNR, Firenze³, Italy; Università degli Studi di Torino⁴, Italy

PURPOSE

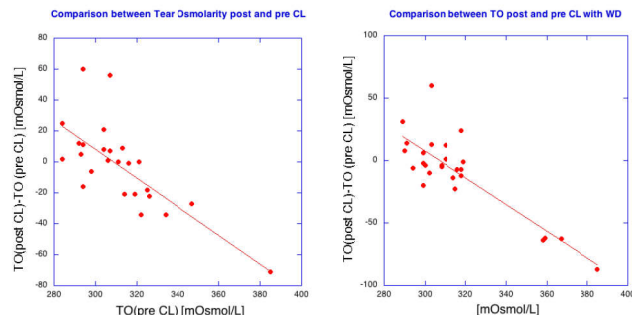
The 2007 Report of the Dry Eye Workshop (DEWS) states that contact lens (CL) wear is a significant etiological cause of dry eye. Discomfort during contact lens wear is one of the major causes of drop out. The frequency of contact lens related dry eye is about 50 percent of the wearers (Begley et al, 2000; Nichols and Sinnott, 2006), and it can be associated with reduced wearing comfort. Approximately half of patients in the United Kingdom and three-quarters of those in the United States who drop out do so because of lens wear discomfort (Pritchard, 2001). Wetting agents are used to improve comfort during the wearing period.

Tomlinson et al (2006) affirms that tear hyperosmolality, indicated by a value superior to 316 mOsmol/L, is better in accuracy to any other single test for dry eye assessment. The measurement of the tear osmolality (TO) is reported to be the best single test for the diagnosis of dry eye (Khanal et al, 2008).

The aim of the study was to investigate the impact of CL wear on TO, and the effect of commercial wetting drops (WD) on tear osmolality.

METHODS

26 subjects, non CL wearers, were recruited from the students of the Course of Optometry at School of Optometry (IRSOO) in Vinci, Italy. Measurement of the TO (Tear Lab, TearLab Co USA), NIBUT (Sirius, CSO Srl Italy) and BUT were performed in the afternoon of the day 1. Two CL (Nelfilcon A) were fitted in the morning of the day 2, and the subjects were instructed to use WD (hyaluronic acid) only on one eye (randomly assigned) every 3 hours. After 8 hours NIBUT on CL and TO were taken and NIBUT and BUT were measured, after the CL were removed.



RESULTS

The mean change in tear osmolality (CTO) induced by contact lens wear was: -2,88 for lens alone and -8,54 for lens plus WD. Plotting the changes in TO vs the baseline TO (Fig. 1 and 2) apparently shows good correlation, higher with the use of WD (Pearson -0,73 for lens alone, -0,84 for lens plus WD). Yet, t-test shows that these values are not significant ($p=0.634$ for lens and $p=0.179$ for lens plus WD). Also, the effect of WD on TO was not significant ($p=0.4391$).

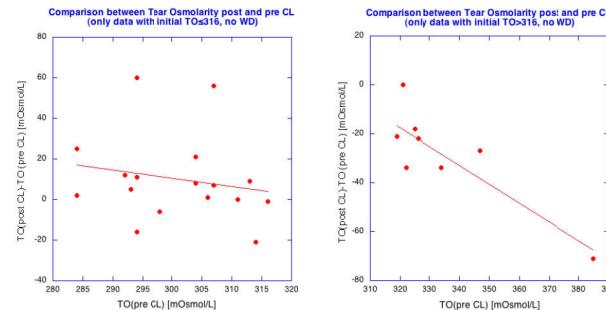
Basing on the discriminating limit indicated by Tomlinson et al (≤ 316 and > 316), we grouped subjects by Baseline TO (BTO). The changes induced by the contact lens wear become significant for subjects with higher BTO.

For the contact lens alone the mean difference in TO was +10,17 fl 21,30 for the group with BTO ≤ 316 , and -27,55 fl 20,31 for BTO > 316 . T-test for the grouped paired data was $p=0,0665$ for the group with BTO ≤ 316 , and $p=0.0025$ for BTO > 316 .

For the contact lens plus WD the mean difference in TO was +2,78 fl 19,40 for the group with BTO ≤ 316 , and -31 fl 39,64 for BTO > 316 . T-test for the grouped paired data was $p=0,5996$ for the group with BTO ≤ 316 , and $p=0.0086$ for BTO > 316 .

The changes induced by the use of WD on the difference in TO before and after contact lens wear were not significant, neither for the group with BTO ≤ 316 ($p=0,29$) nor for the group with BTO > 316 .

Fig 3, 4, 5 and 6 show comparison between TO pre and post lens wear for the two different groups and for lens alone and lens plus WD.



CONCLUSIONS

The data of our study shows that wearing contact lens for a day, in a group of students who are not CL wearers, does not modify TO highly, neither for lens alone ($p=0,634$) nor for lens plus wetting drops ($p=0,179$). However, we found a strong and significant reduction in TO (-31 , $p=0.0086$) for BTO > 316 by grouping subject by Baseline TO. Although it's common opinion that the use of contact lenses is a significant etiological cause of dry eye, our data does not support this statement. On the contrary, the use of contact lenses on eyes with manifest dry eye could reduce TO and consequently improve comfort. It could be possible that these results are due to the type of contact lenses used, containing different wetting agents.

The use of wetting drops every three hours does not lead to a major benefit in term of reduction of TO. It's possible that the frequency of the use of wetting drops was too low to lead to a stronger and significant effect.

The fitting of CL in patients who have dry eye with BTO > 316 can reduce TO and should not be preventively discouraged.

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