



Confocal microscopic appearance and thickness of the cornea following extended wear contact lenses: A study with neophytes

Inma Pérez-Gómez MSc Philip B Morgan PhD MCOptom and Nathan Efron PhD DSc

Eurolens Research, Department of Optometry and Neuroscience, UMIST, Manchester, UK



Purpose

The aim of this study was to monitor cellular and thickness changes in the cornea using the confocal microscope on a group of neophytes wearing the PureVision lens (Bausch and Lomb) in one eye and the Acuvue 2 lens (Vistakon) on the contralateral eye.

Methods

In-vivo slit-scanning real-time confocal microscopy and ultrasound pachometry were performed on both eyes of 23 myopic subjects (11 M, 12 F, age 23 ± 3 years) at baseline (initial visit, before lens wear), after three and six months of lens wear, and after one week during which no contact lens were worn (post cessation visit). Data were analysed using Super ANOVA 1.11 (Abacus Concepts Inc).

Results

Anterior keratocyte density did not change between the four visits ($F=0.9$, $p=0.46$) and was no different for the two lenses ($F=1.6$, $p=0.21$). Posterior keratocyte density was similar for the two lenses at the different visits ($F=0.1$, $p=0.82$), but there were differences between the visits

Results *continued*

($F=18.44$, $p=0.0001$). Cell counts at the three month, six-month and final visit were found to be lower than at the initial visit (Post hoc analysis). There was an overall drop in keratocyte density of 14% in both eyes at the six month visit, compared to the initial visit. No differences were found between the two lenses ($F=0.1$, $p=0.81$) or the four study visits ($F=1.4$, $p=0.26$) for the endothelial cell density. Corneal thickness was similar for the two lenses at the initial and post-cessation visits, but was 3% greater for the eye wearing the Acuvue 2 lens at the six month visit relative to the post-cessation visit ($F=4.3$, $p=0.0169$).

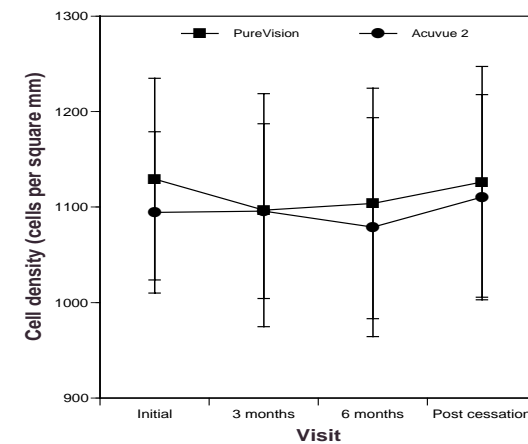


Figure 1. Anterior stromal keratocyte density (mean \pm standard deviation) at the initial, three month, six month and one week post-recovery visits.

Results *continued*

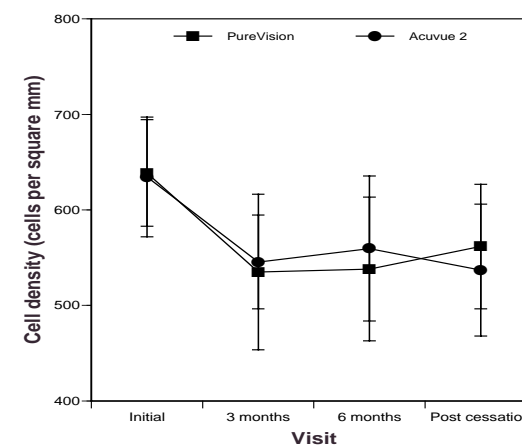


Figure 2. Posterior stromal keratocyte density (mean \pm standard deviation) at the initial, three month, six month and one week post-recovery visits.

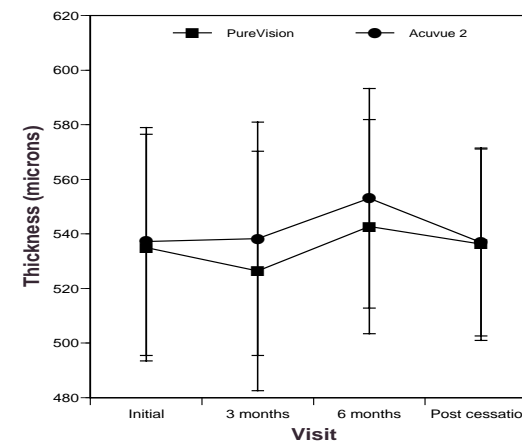


Figure 3. Corneal thickness (mean \pm standard deviation) at the initial, three month, six month and one week post-recovery visits.

Conclusion

Corneal thickness changes were consistent with the relative oxygen performances of the two lens types. The loss of keratocytes cannot be attributed to hypoxia and/or oedema, because keratocyte loss occurred in both the oedematous and non-oedematous corneas. Moreover, these results could not be explained by an artifact relating to presence of residual oedema, because the decrease in posterior stromal keratocyte density noted at six months in the oedematous cornea of the eye wearing the Acuvue 2 lens was still evident one week after ceasing lens wear, at which time the residual oedema had resolved. It is postulated that lens-induced keratocyte loss may be related to the physical presence of contact lenses creating some mechanical effect.

Correspondence

Inma Pérez-Gómez. Department of Optometry and Neurosciences. UMIST. PO Box 88. Manchester M60 1QD. UK. E-mail: ma.i.perez-gomez@stud.umist.ac.uk