

**Topographical Corneal Epithelial Thinning induced by Long Term
Wear of Hydrogel Lenses**

Javier González Pérez, DOO
Jose Manuel González Méijome, DOO
Isabelle Jalbert, O.D.
Deborah F Sweeney, PhD
Paul Erickson, PhD

ABSTRACT

Purpose: To characterise the epithelial thickness profile and study the effects of long term wear of hydrogel lenses on this profile.

Methods: Epithelial thickness was evaluated in fifteen subjects who had worn one of two types of low oxygen transmissibility (Dk) hydrogel lenses for an average of 10 years (range 7 to 16 years) and compared to a group of eighteen control subjects who had never worn contact lenses. Epithelial thickness was measured at the centre, four mid-peripheral and four peripheral locations in the vertical and horizontal meridians of the cornea using a modified optical pachometer.

Results: Lens wearers had significantly thinner epithelium than controls (ANOVA, $p < 0.001$) in the central ($41 \pm 7 \mu\text{m}$ vs $48 \pm 5 \mu\text{m}$), mid-peripheral ($41 \pm 7 \mu\text{m}$ vs $48 \pm 7 \mu\text{m}$) and peripheral ($42 \pm 9 \mu\text{m}$ vs $48 \pm 6 \mu\text{m}$) cornea. The extent of thinning ranged from 8.7% to 18.4% of the total epithelial thickness, was not associated with the duration of wear ($p = 0.87$) and was significantly greater for the lower Dk lens type (ANOVA, $p < 0.001$). Topographical position did not have a significant effect on epithelial thickness (ANOVA, $p > 0.16$).

Conclusion: This study establishes that the epithelial thinning associated with hydrogel lens wear is topographically uniform. It also confirms that this effect is inversely related to lens oxygen transmissibility but does not appear to increase with longer duration of wear.

KEY WORDS

Epithelial thickness, modified optical pachometry, long term contact lens wear, hypoxia