A high level of oxygen in the pre-corneal tear film during contact lens wear is required to prevent structural and physiological changes associated with hypoxia. Adequate oxygen access to the ocular surface is a non-negotiable requirement.

The minimum atmospheric oxygen requirements to prevent corneal effects include:

- Central atrophy: 1% oxygen
- Loss of sensitivity: 9% oxygen
- Corneal edema: 10% oxygen
- Endothelial blebs: 16.6% oxygen

Other assumptions included that the corneal oxygen consumption rate and the lens centre thickness were constant during the measurement period. The solubility of oxygen in silicone was derived from the weighted k of PDMS for each lens.

In this study, Equivalent Oxygen Percentage (EOP), oxygen partial pressure under a lens (P02), Central (measured) Dk/t (8 mm) and the lens was assessed at 0.5 g of the lens. Each data point represents the relative mean of 10 subjects for each lens.

The relationship between EOP and P02 was significant (P < 0.001). The relationship between %EOP and %Dk/t was significant (P < 0.001) for each lens. The critical level for statistical significance was p < 0.05, with adjustments for multiple comparisons.

Statistical methods were used to calculate the correlations between EOP and Dk/t, oxygen flux, the contact lens oxygen uptake rates and open eye conditions.

R-square values were estimated to determine the factors that influence EOP and oxygen uptake rates. The critical level for statistical significance was p < 0.05, with adjustments for multiple comparisons.