**BACKGROUND**

- Recent anecdotal reports from practitioners describing an "unintended Ortho-K" type effect with silicone hydrogels in a small percentage of patients.1
- Refractive changes inconsistent (i.e. onset unpredictable, often unilateral) in affected patients.
- Reports of associated topographic changes (central corneal flattening and mid-peripheral steepening)2 (Figure 1).
- Corneal topography changes and observed tear film profiles with inverted silicone hydrogel contact lenses appear qualitatively similar to reverse geometry lenses with orthokeratology (Figures 2-4).

**PURPOSE**

To investigate the effects of lens inversion on vision and subjective comfort in a short-term, non-dispensing trial.

**METHODS**

- Ten subjects.
- Contra-lateral, double masked, randomised.
- In each trial, subjects were an inverted lens in one eye and the same lens type, correctly inserted in the contra-lateral eye for 20 minutes.
- Four commercially available lenses were tested, each in +/- 3.00 dioptres; Focus Night & Day (Base curves: 8.4 and 8.6), Purevision and Acuvue 2 (Figure 5).

**RESULTS**

- Prior to lens wear, there was no significant difference between subject’s right and left eyes for subjective ratings and vision ratings (p=0.05).
- After 20 minutes of Acuvue 2 wear, vision and comfort ratings were significantly reduced for inverted lenses relative to those inserted correctly (all p<0.01) (Figure 6).
- For Purevision, comfort but not vision ratings was significantly worse for inverted lenses (p=0.03) (Figure 7).
- For Focus Night & Day 8.4/+3.00, 8.4/-3.00 and 8.6/-3.00 lenses, comfort and vision were similar between inverted and non-inverted lenses. For 8.6/+3.00 lenses, comfort but not vision was significantly reduced with inverted lenses (p=0.02) (Figures 8 and 9).

**DISCUSSION**

- Results suggest that when a conventional hydrogel (Acuvue 2) is worn inside-out, there is a reduction in vision and comfort. This therefore alerts the patient to the possibility of the lens being worn incorrectly.
- Our results demonstrate that when silicone hydrogel lenses are worn inverted, there is no decrement in either vision or comfort. This was true for both Focus Night and Day and Purevision lenses (for Purevision only a slight reduction in comfort was observed). Given such a situation, the patient is likely to continue to wear inverted lenses for extended periods of time.

**CONCLUSION**

- Unlike conventional hydrogels, silicone hydrogel lenses are not associated with any immediate decrement in vision and comfort when worn inverted. Therefore patients are likely to continue wearing their lenses incorrectly over extended periods of time. This could potentially lead to the "unintended Ortho-K" effect reported.

**REFERENCES**


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