Effect of the Base Curve of Silicone Hydrogel Bandage Contact Lenses on Post-PRK Outcomes

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Background

- Bandage soft contact lenses (BSCLs) are routinely used after photorefractive keratectomy (PRK) to mitigate pain.
- A previous study found the Acuvue® Oasys® significantly more comfortable than 2 other common BSCLs.

Purpose

• Evaluate relative pain and rate of contact lens loss with two base curvatures (BC) of the Acuvue® Oasys® BSCL following PRK.

• Refractive lenses customize BC for enhanced vision,* but is this appropriate for pain reduction in BSCLs?

• 8.4 mm vs 8.8 mm
  • Tighter to prevent slippage?
  • Customize fit according to corneal shape?

Materials and Methods

• Randomized, controlled, double masked study containing 140 patients
• Eyes were randomized to receive 8.4 or 8.8 mm BC lenses postoperatively.
• Allegretto® or VISX™ laser choice was surgeon-dependent.
• Discomfort measured on a VAS Pain (0-10) scale at 1 and 4 days postoperatively. This was assessed using a patient questionnaire.
Materials and Methods

• Inclusion criteria:
  • Bilateral primary PRK for myopia
  • Age ≥21 at the date of pre-operative evaluation
  • Medically appropriate candidate for PRK

• Soft contact lenses were removed at least thirty days and hard contact lenses at least one month per decade of wear prior to treatment.
Materials and Methods

• Patients stratified according to steep keratometry (K)
  • Pre-op K used to estimate peripheral steepness
    • Only the central cornea is affected by refractive surgery
    • Assume that the pre-op central K reflects the post-op peripheral K
  • Post-op K to estimate central steepness
    • This is the area affected by refractive surgery

http://www.worldclasslasik.com/new-york-lasik/what-is-prk/
Data Analysis

• Data was analyzed to reflect the effect of corneal shape on which base curve was most comfortable.

• Three separate analyses were performed:
  • All patients analyzed together.
  • Allegretto laser only (marketed as maintaining a more prolate cornea).
  • VISX laser only (may lead to more oblate corneas).

• Left and right sides of each chart show pre- and postoperative K readings.

• Bars reflect patient-reported VAS Pain scores for each BC of the Acuvue Oasys lens.
**Figure 1:** All Patients: Pain Scores by Preoperative (A) and Postoperative (B) Keratometry Readings for 8.4 vs 8.8 mm BC Acuvue Oasys lens

**Day 1**

- **Preoperative Keratometry Readings**:
  - $40 < K \leq 42$
  - $42 < K \leq 45$
  - $45 < K < 48$

- **Postoperative Keratometry Readings**:
  - $36 \leq K \leq 38$
  - $38 < K \leq 40$
  - $40 < K \leq 42$
  - $K > 42$

**Day 4**
Figure 2: Allegretto Laser: Pain Scores by Preoperative (A) and Postoperative (B) Keratometry Readings for 8.4 vs 8.8 mm BC Acuvue Oasys lens
Figure 3: VISX Laser: Pain Scores by Preoperative (A) and Postoperative (B) Keratometry Readings for 8.4 vs 8.8 mm BC Acuvue Oasys lens
Results

• Patients’ corneal curvature was the differentiating factor for which lens was most appropriate
  • Steeper corneas (high K) $\rightarrow$ Tighter BC (8.4)
  • Flatter corneas (low K) $\rightarrow$ Looser BC (8.8)
• Laser type determined comfort too!
  • Allegretto® $\rightarrow$ Tighter BC (8.4) regardless of K
  • VISX™ $\rightarrow$ BC depends on K value
• Five eyes lost their BSCL.
  • Four of the eyes were wearing 8.8 mm BC and had very steep preoperative Ks (≥ 45).
Conclusion

• When using Acuvue Oasys as a BSCL after PRK
  • Steeper Ks are more comfortable with 8.4mm
  • Flatter Ks are more comfortable with 8.8mm
  • Patients treated on the Allegretto should always receive an 8.4 mm lens, likely because they have more prolate corneas postoperatively.
• Fitting a BSCL to corneal curvature also decreases lens loss
• Further studies needed to clarify if fitting lenses according to corneal curvature is appropriate for other brands of BSCLs.