

Optimal Pocket Depth for Corneal Inlays

To the Editor:

Changes in refraction following small-aperture corneal inlay implantation (KAMRA; AcuFocus, Irvine, CA) for the treatment of presbyopia are mainly due to hyperopic shift.¹⁻³ A possible explanation for this is a wound healing response postoperatively, with keratocyte activation and stromal thickening, resulting in changed corneal topography.^{2,3}

The AcuFocus guidelines for implantation suggest that the intrastromal pocket be created at a depth of 200 to 250 μm while maintaining a residual stromal bed of 250 μm .⁴ We postulated that shallow pocket depth is associated with greater wound healing response due to keratocyte populations being denser in the anterior stroma.⁵ Thus, increasing pocket depth would lead to less wound healing response and subsequent hyperopic shift. Recently, we compared the change in manifest refraction spherical equivalent (MRSE) and uncorrected near visual acuity (UNVA) over time for patients who received small-aperture corneal inlays at intrastromal pocket depths of 200 to 249 and 250 to 300 μm . This study was approved by the HDR Research Review Board (Draper, Utah) and all data were collected in accordance with the tenets of the Declaration of Helsinki from patients who provided informed consent.

Seventy-nine patients had small-aperture corneal inlays implanted between May 2015 and April 2017. Fifty-two inlays (66%) were implanted at a depth of 200 to 249 μm and 27 inlays (34%) were implanted at a depth of 250 to 300 μm . The average preoperative MRSE for the two groups was -0.45 and -0.49 diopters (D), respectively. MRSE and UNVA were reported for 3 and 12 months postoperatively.

Both groups maintained good uncorrected distance visual acuity, with 89% seeing 20/40 or better at 12 months compared to 93% preoperatively. At 3 months, UNVA of Jaeger 5 (J5) or better was 90% for 250 μm or greater and 81% for less than 250 μm . At 12 months, UNVA of J5 or better was 89% for 250 μm or greater and 77% for less than 250 μm . At 12 months postoperatively, average MRSE changed +0.45 and -0.17 D for the less than 250 μm and 250 μm or greater groups, respectively (**Figure 1**). Hyperopic shift occurred in the shallow group and did not in the deeper group.

These preliminary data reflect that the ideal intra-

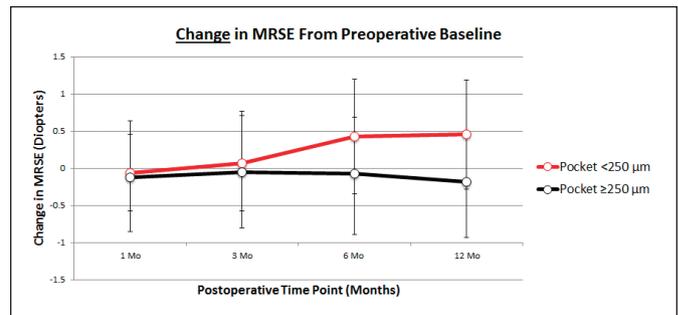


Figure 1. Change in manifest spherical equivalent refraction (MRSE) from preoperative baseline.

stromal pocket for the KAMRA inlay is deeper (250 to 300 μm) than the suggested 200 to 250 μm for the best visual outcomes. This may be because increased pocket depth leads to less wound healing response and can be further evaluated with the aid of confocal microscopy in future studies. However, it is important to maintain the integrity of the residual stromal bed while increasing the depth of the KAMRA pocket. Further study on intrastromal pocket depth may be warranted based on this preliminary data.

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