

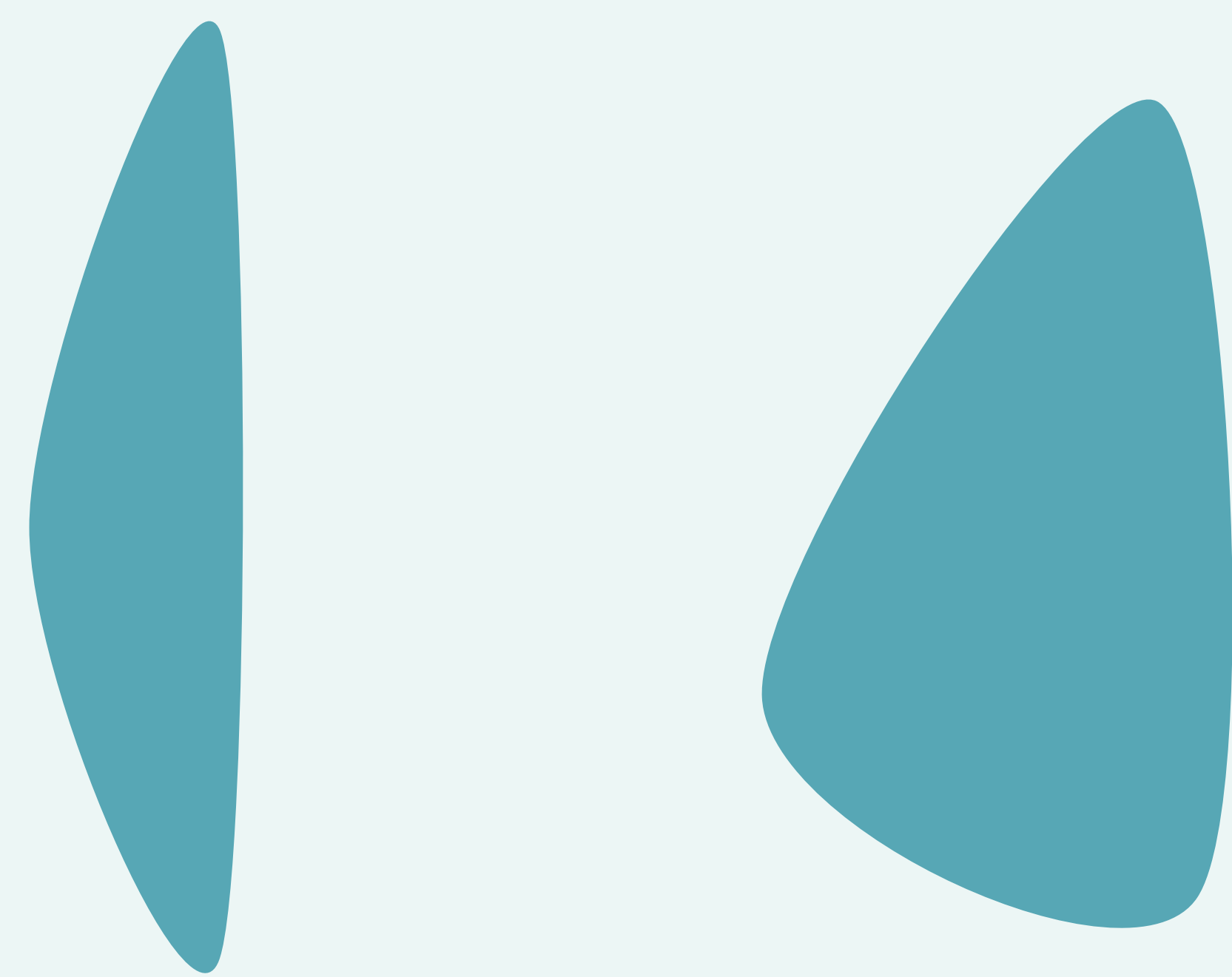
Exploring The Potential of Topography-Guided Custom Ablation Treatment In Refining Keratoconus Treatment



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INTRODUCTION

- Keratoconus (KC) is a progressive eye disease that primarily affects the cornea. In keratoconus, the cornea thins and bulges outward and inferiorly, resembling a cone. As such, it is often associated with an uneven corneal surface. The unevenness, known as astigmatism and higher-order aberrations (HOAs), typically cause visual distortions such as blurred vision, glares, and halos.
- Corneal cross-linking (CXL) has been shown to slow the progression of keratoconus. CXL helps strengthen the cornea to prevent it from further bulging. This process uses riboflavin, a light-sensitive vitamin, and UV light to create new bonds between collagen fibers, ultimately increasing the stiffness and stability of corneal tissue.
- Topography-Guided Custom Ablation Treatment (TCAT) is considered a supplemental treatment to CXL, aiding in smoothing the unevenness in the cornea. This report analyzes potential differences in corneal topographic maps in the treatment of keratoconus with crosslinking and with or without TCAT.



Normal Cornea

Keratoconus Cornea

METHOD

- Eight eyes diagnosed with keratoconus underwent crosslinking at LASIK Experts. In five eyes, cross-linking was combined with TCAT using the Alcon WaveLight EX500. Three eyes underwent CXL without TCAT.
- This was a retrospective review comparing preoperative and postoperative corneal topographic maps from the Oculus Pentacam HR.

RESULTS & DISCUSSION

- Figure 1a and 1b includes the pre and postoperative pentacam scans for the CXL procedure without TCAT.
- Without TCAT, the apex elevation remains constant postoperatively at +28 μ with no upward shift to improve inferior drooping.
- The axial sagittal map shows no normalization of the astigmatism pattern with no improvement of radial skew.

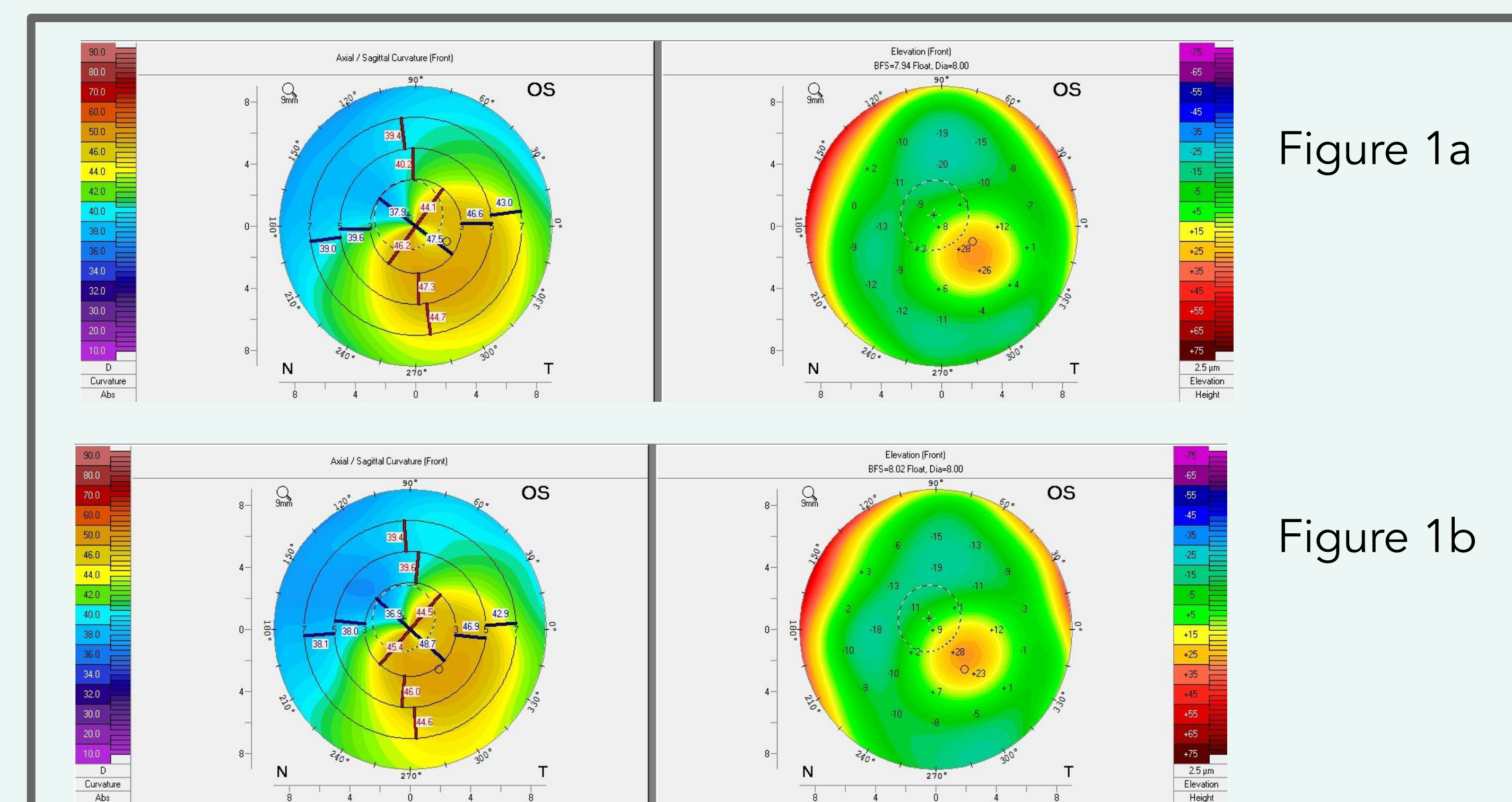


Figure 1a

Figure 1b

- Figure 2a and 2b include the pre and postoperative pentacam scans for the CXL procedure with TCAT.
- Postoperatively, the elevation decreases from +52 μ to +44 μ indicating a flattening of the corneal surface. There is centralization of the apex represented by an upward shift with less inferior drooping.
- On the axial sagittal map, there is more normalization of the astigmatism pattern with-the-rule as it now presents with the classic "bowtie" pattern and no radial skew.

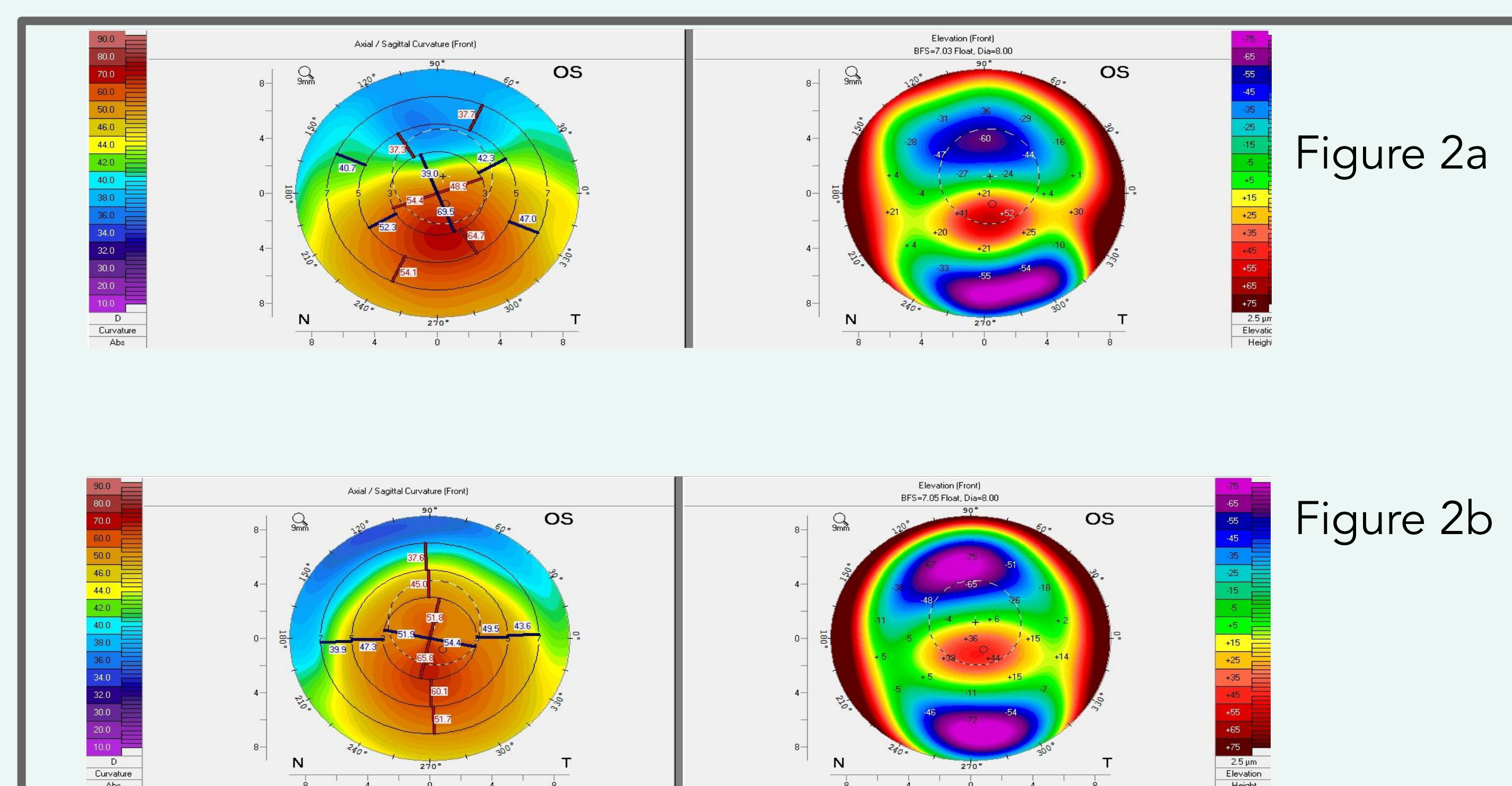


Figure 2a

Figure 2b

CONCLUSION

- CXL is a valuable procedure for halting the progression of keratoconus by strengthening the corneal tissue. However, combining CXL and TCAT may offer additional benefits. TCAT helps reshape the corneal surface by centralizing the inferotemporal apex, flattening the cornea, and normalizing the astigmatism pattern.
- The combination of both CXL and TCAT offers a two-pronged approach for KC treatment to strengthen the cornea, improve vision, and improve contact lens fitting.



REFERENCES

- Kaiserman, I., Karmona, L., Sela, T., Franco, O., Shoshani, A., & Munzer, G. (2011). Simultaneous Topography-guided Surface Ablation with Collagen Cross-linking for Keratoconus. International Journal of Keratoconus and Ectatic Corneal Diseases, 5(2), 71-76.