

Corneal regularization following customized corneal collagen cross-linking

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Key words: Customised corneal collagen crosslinking, CXL, PiXL, Keratoconus

Keratoconus exhibits a focal biomechanical modification rather than a uniform generalized weakness.^[1] A differential

biomechanical weakening in the area of the cone, with a greater efficacy of cone centric treatments for the reduction of corneal curvature has been demonstrated.^[2] Clinical application of this principle forms the basis of customized cross-linking (PiXL). A handful of studies report promising results with this novel technique, demonstrating corneal surface regularization and visual improvement.^[3-5]

Case

We present the case of a 14-year-old who underwent PiXL using an epithelium-off approach in the right eye for progressive keratoconus [Fig. 1a]. Ultraviolet A irradiation of 5.4, 10, and 15 J/cm² was applied in three concentric

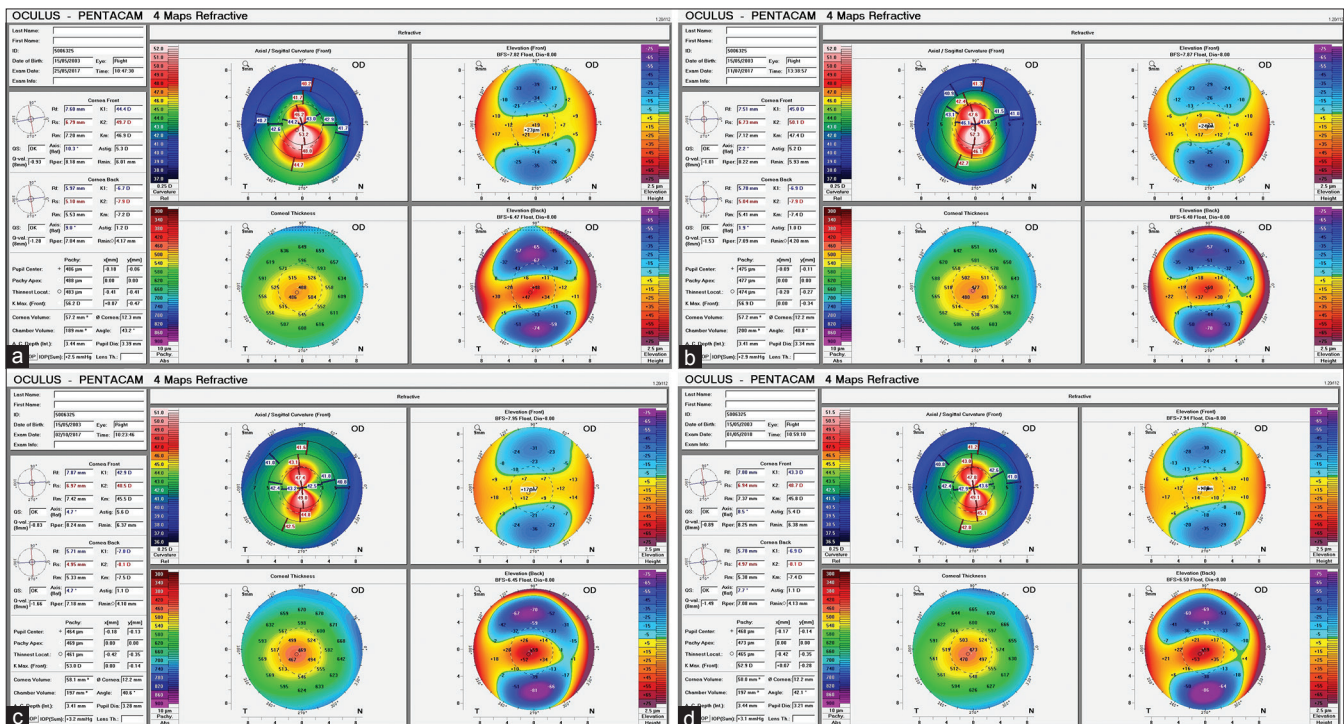


Figure 1: Preoperative corneal topography (a). Significant mean astigmatism reduction with anterior surface regularization at 6 weeks (b) and 3 months (c) postoperative visit, with subsequent stabilization up till 1-year follow-up (d)

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circles (7 mm, 5 mm, and 3 mm, respectively) centered on the maximum elevation of the posterior float, using the Mosaic delivery system (KXL II, Avedro Inc., Waltham, MA, USA). A mean keratometric reduction of 1.4 D [Fig. 1b and c] with a subsequent improvement in best-corrected distance visual acuity from 6/12 to 6/7.5 was noted at 3-months, with a subsequent stabilization up till 1-year follow-up [Fig. 1d]. No visually significant haze or endothelial cell loss was noted. The fellow eye was within normal limits.

Discussion

In our case, the treatment was centered on the maximum posterior float elevation. The use of varying treatment patterns including customized toric, asymmetric arcuates, and concentric circles has been described. In a majority of the earlier studies, the treatment was centered on the area of greatest curvature. However, centration of irradiation around the maximum point of posterior float elevation may be more intuitive since pachymetry as well as curvature is modulated by epithelial thickness and tear film.

Conclusion

In conclusion, we describe the clinical changes that ensue following PiXL over a 1-year follow-up. This ophthalmic image highlights the corneal tomographic changes and adds to the limited literature on this novel technique.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have

given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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