

## BACKGROUND

Pellucid marginal degeneration (PMD) is a progressive disorder characterized by abnormal thinning of the peripheral cornea. Keratoconus and PMD share many similarities. These patients can have clearer and more stable vision with rigid contact lenses over glasses correction. In recent years, scleral contact lenses have been one of the lenses of choice for patients with more advanced corneal disorders when glasses correction fails to meet their visual needs. Scleral contact lenses can mask the irregularity of the cornea by vaulting over the cornea with a fluid filled reservoir while landing on the sclera for improved comfort. Scleral lenses now also offer advanced multifocal technology.

## CASE DESCRIPTION

A 57 year old male presented for replacement scleral contact lenses. He was having difficulty driving at night with his current scleral lenses from the previous year. The patient had a history of pellucid marginal degeneration and TBI. The patient had not had any ocular surgeries. At his follow up he showed over refractions with his habitual lenses, but he also expressed interest in having decreased dependence on reading glasses. His right eye was determined to be dominant and he had 4 mm pupil diameters in normal mesopic lighting.

The patient's current scleral lenses were a standard design for the right lens and a toric advanced peripheral system (APS) design for the left lens. The right lens needed to be modified to include a toric advanced peripheral system in addition to increasing the overall clearance. The mid-peripheral clearance of the left lens needed to be increased along with the over refraction to both lenses to provide sharper vision.

The new lenses ordered for both eyes were Zen Multifocal scleral lenses with toric advanced peripheral systems and Boston XO<sub>2</sub> material. Rotation was noted and stabilized with toric APS in order to align the center near multifocal zone. The initial lens design used had a 1.5 mm near zone OD and 2.0 mm near zone OS since the right eye was dominant. Both lenses were ordered with a near zone decentration of 0.5 mm to provide sharp vision at distance and near and to follow the lens design shown in Figure 1.

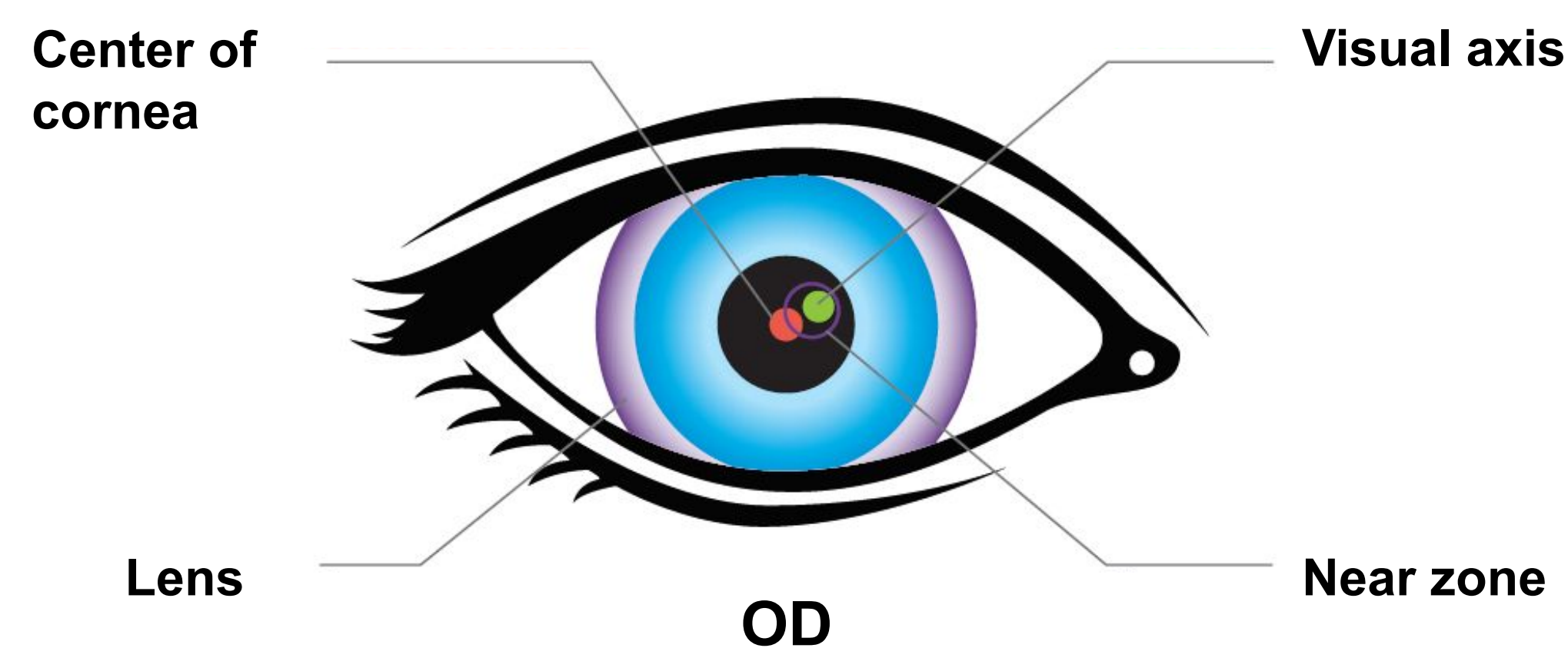


Figure 1: Zen Multifocal lens design shows the different characteristics of the lens including the visual axis and near zone decentered superior nasal.

## ZEN MULTIFOCAL PROLATE LENS PARAMETERS

	Material	Sag	Base Curve	Diameter	CT	Advanced Peripheral System	Power	Add	Center Near Zone	Multifocal Decentration
OD Final	Boston XO <sub>2</sub>	5200 microns	6.70 mm	16.00 mm	0.35 mm	Horiz: Flat 3 Vertical: Steep 3	-7.00	+1.00	1.50 mm	0.5 mm Axis 090
OS Final	Boston XO <sub>2</sub>	5475 microns	6.40 mm	16.00 mm	0.35 mm	Horiz: Flat 3 Vertical: Steep 2	-9.75	+2.25	2.50 mm	0.5 mm Axis 045

## AXIAL & TANGENTIAL MAPS

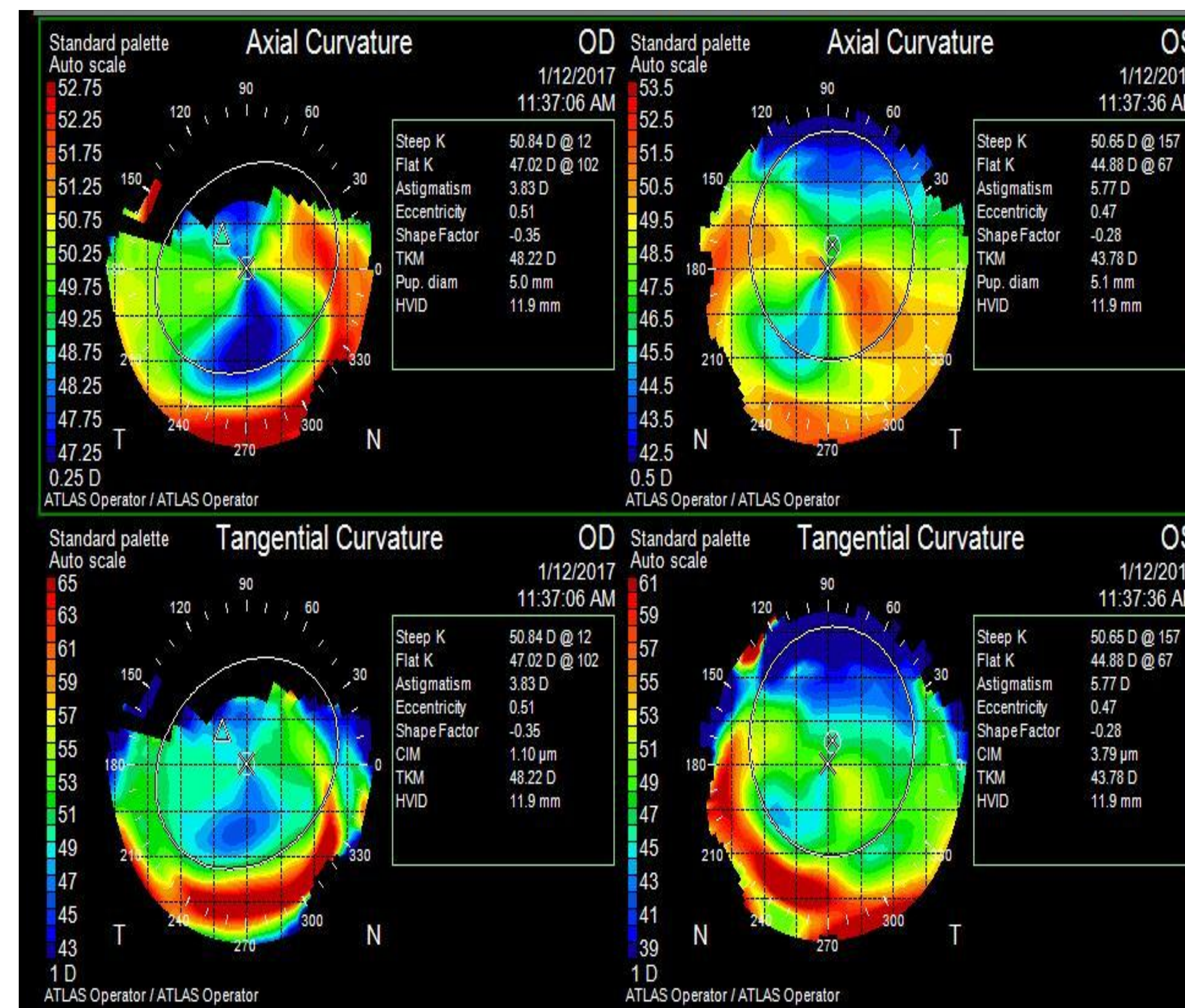


Figure 2: The Zeiss Atlas 900 corneal topographer was used for baseline topography images. The classic "crab claw" or "kissing birds" pattern of pellucid marginal degeneration is shown in both the axial and tangential maps for the right and left eyes.

## CONCLUSIONS

Scleral contact lenses can provide good comfort and superior vision to patients, especially those with pellucid marginal degeneration and keratoconus. In this patient, he was able to achieve 20/25 vision at distance and near OU with good comfort, adequate clearance, and without blanching or edge lift.

Multifocal scleral lenses can be considered as an option for presbyopic patients like in this case. These fits can be more difficult, but the benefit to the patient is worth trying to reduce dependence on glasses. These lenses incorporate asymmetric geometry; therefore, the patient needs to understand the importance of orienting the marking dots in the correct position.

Multifocal optics can be difficult to deliver to scleral lens patients because they lenses often exhibit significant inferior temporal decentration. In this case, the Zenlens design incorporated proper decentration to realign the center near optics over the visual axis. The outcome gave the patient good functional vision at distance and near. For these reasons, multifocal lenses can be considered even for scleral lens patients with irregular corneas.

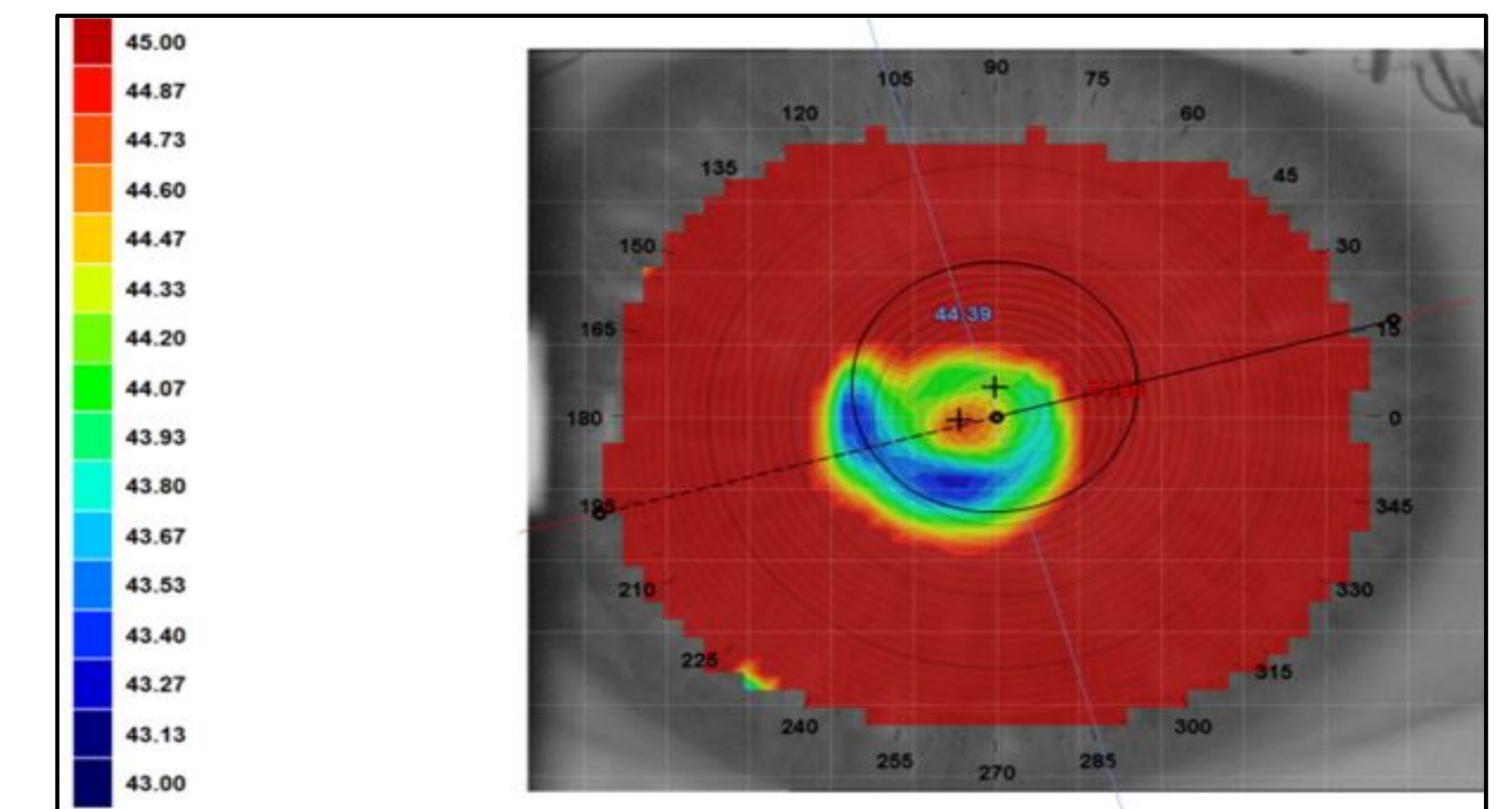


Figure 3: Medmont topography of the Zen Multifocal OD lens. The smaller center near zone is present due to OD being the dominant eye.

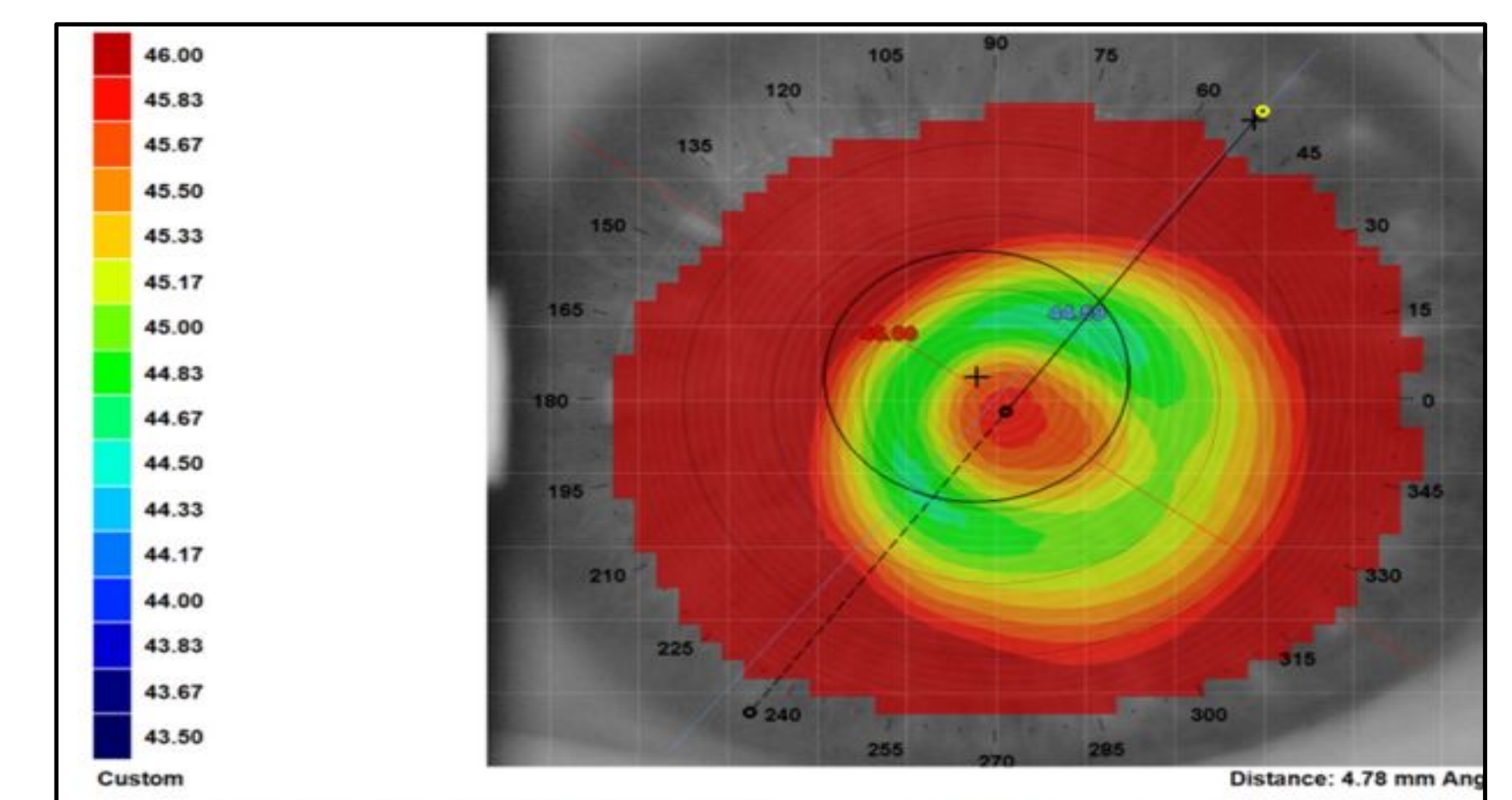


Figure 4: Medmont topography of the Zen Multifocal OS lens. The larger center near zone is present due to OS being the non-dominant eye. The center near zone is decentered superior nasal to the center of the cornea which follows the preferred optical alignment for this lens.