Retrospective analysis of 32 patients (40 eyes) fitted with
Amount of post-settling rotation
Scleral lens sagittal depth difference
All fitted lens had shallow elevation along the horizontal
We evaluated:
Fitting indications
Presence of toric peripheral curves
Amount of post-settling rotation
Pentacam meridional analysis was performed to
deetermine shallow versus tall meridian axes of the front
corneal surface. Meridian axis approximation was
obtained by utilizing the front elevation display from four
refractive map analysis (Figure 1).

Methods:
• Retrospective analysis of 32 patients (40 eyes) fitted with
  DSD lenses at the Department of Ophthalmology, Emory University from June to September of 2023
• All fitted lens had shallow elevation along the horizontal meridian and higher elevation along the vertical
• We evaluated:
  o Fitting indications
  o Scleral lens sagittal depth difference
  o Presence of toric peripheral curves
  o Amount of post-settling rotation
• Pentacam meridional analysis was performed to
determine shallow versus tall meridian axes of the front
corneal surface. Meridian axis approximation was
obtained by utilizing the front elevation display from four
refractive map analysis (Figure 1).

Results:
• 35 eyes were keratoconic, 3 after corneal transplant, and 2 with
corneal scarring (Figure 2)
• Mean front corneal astigmatism was 5.9 (range 0.5 to 13.4)
diopters, with SD of 3.59 (Figure 3)
• Average DSD difference was 263±56 um, & difference of 200-300
um was most utilized (87.5% of eyes) (Figure 4)
• In most instances (85%), DSD lens meridian with higher
elevation rotated toward the shallow front corneal meridian.
Average rotation was 19.7±2.05 degrees (Figure 6)
• Most lenses had spherical/minimally toroidal landings (Figure 5), but all fitted lenses exhibited on-eye stability in follow up

Conclusions:
Higher sagittal depth meridian of DSD scleral lens tends to rotate
toward the shallow front corneal meridian, with misalignment of
up to 20 degrees in vast majority of cases. Utilizing this technology
may provide on-eye stability achieved by the elevation
differences of cornea and contact lens meridians. 85% of eyes
required minimal or non-toric peripheral curves. Accurate
prediction of SL rotation allows for efficient factoring in of toric or
multifocal front optics due to predictable stability of DSD lens.

References:

Background:
Scleral lenses (SL) with dual sagittal depth (DSD) allow advanced fitting on eyes with front corneal elevation differences, specifically those with keratoconus. Many SL patients may need front toric or multifocal optics to achieve best vision. Predicting on-eye rotation can maximize fit success and shorten chair time in absence of DSD trial lenses. The study aims to predict the expected amount of SL rotation based on front surface corneal elevation maps.

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