Instructions to Use: Dr Zain's Presbyopic LASIK Ray Diagram Calculator

Overview

This interactive calculator simulates depth of focus changes for hypermetropic presbyopic patients undergoing customized LASIK on the Wavelight EX500 platform. It visualizes how Q value modulation, binocular inherent accommodation (BIA), refraction changes, and monovision affect near and binocular vision.

Step-by-Step Usage

1. **Enter Actual Refraction**: Input the baseline distance refraction of both eyes (RE and LE). These values are for reference only and do not affect the diagrams.

2. **Set BIA (Binocular Inherent Accommodation)**: This is calculated as 2.5 – binocular reading add. It indicates natural depth of field. A value of 1D typically means the patient can accommodate 1D naturally. The BIA zone (yellow) appears to the **left** of the retina.

3. **Adjust Q Value Modulation**: Choose the Q value change (ΔQ) for each eye. A ΔQ of 0.3 induces 1.25D of depth of focus (DOF), represented by the green bar to the **right** of the retina.

4. **Add Refraction**: This compensates for the Q-induced DOF and moves the green DOF bar **leftward** toward the retina. Each 0.25D refraction added shifts the bar left proportionally.

5. **Apply Monovision**: Select which eye will be given a monovision boost (up to 1.5D). This moves the entire convergence point and DOF bars leftward for the selected eye. Useful for achieving additional near vision.

6. **Check Binocular Overlap**: Enable the checkbox to visualize binocular fusion range (cyan). This is the overlapping DOF of both eyes. Ideal range: **1.0 to 1.5D**. If < 0.75D, a red warning appears indicating poor binocular fusion.

Visual References

- 🔴 Retina line: fixed reference at 0D
- 📖 Near line: 2.5D to the left of retina (near point for 40 cm)
- 🟡 Yellow bar: depth of focus from BIA
- 🟢 Green bar: depth of focus from Q modulation
- 🔷 Cyan zone: binocular DOF overlap (appears if option selected)

Important Notes

• This tool is ONLY applicable to hypermetropic or hypermetropic astigmatic patients.

• It is designed exclusively for the Wavelight EX500 platform using **6mm optic zone**.

• Treatment and Q modulation must be done in **Custom Q mode** after capturing topolyzer images.

• Max allowable Q modulation per eye = 0.36.

• DOF beyond 2.5D is unnecessary, as it corresponds to reading at 25 cm.