

Purpose

Improper lens fits account for about 20% of annual lens dropouts¹.

In an effort to optimize soft contact lens fitting, we sought to determine which is the more valuable data parameter when selecting an initial lens, corneal curvature or corneal diameter, and the significance or impact of each.

We used data points of Horizontal Visible Iris Diameter (HVID) and mean corneal curvature (Km) and compared to sagittal height of the eye at a 14mm chord length. This study used corneal measurements from the OCULUS Keratograph and the 14 mm chord measurements from the Eaglet Eye Surface Profiler.

Methods

Retrospectively, we evaluated ocular shape data from the Eaglet Eye Surface Profiler and the OCULUS Keratograph of 56 with regular corneas of 28 subjects.

Excel was used to create a scatter plot of HVID versus sagittal height at a 14mm chord and Km's versus sagittal height at a 14mm chord.

An r-squared coefficient line was implemented to determine correlation. A 14mm chord was chosen due to the proximity to most soft contact lens diameters.

Oculus Keratograph

- Topography
- Data obtained: Km, HVID

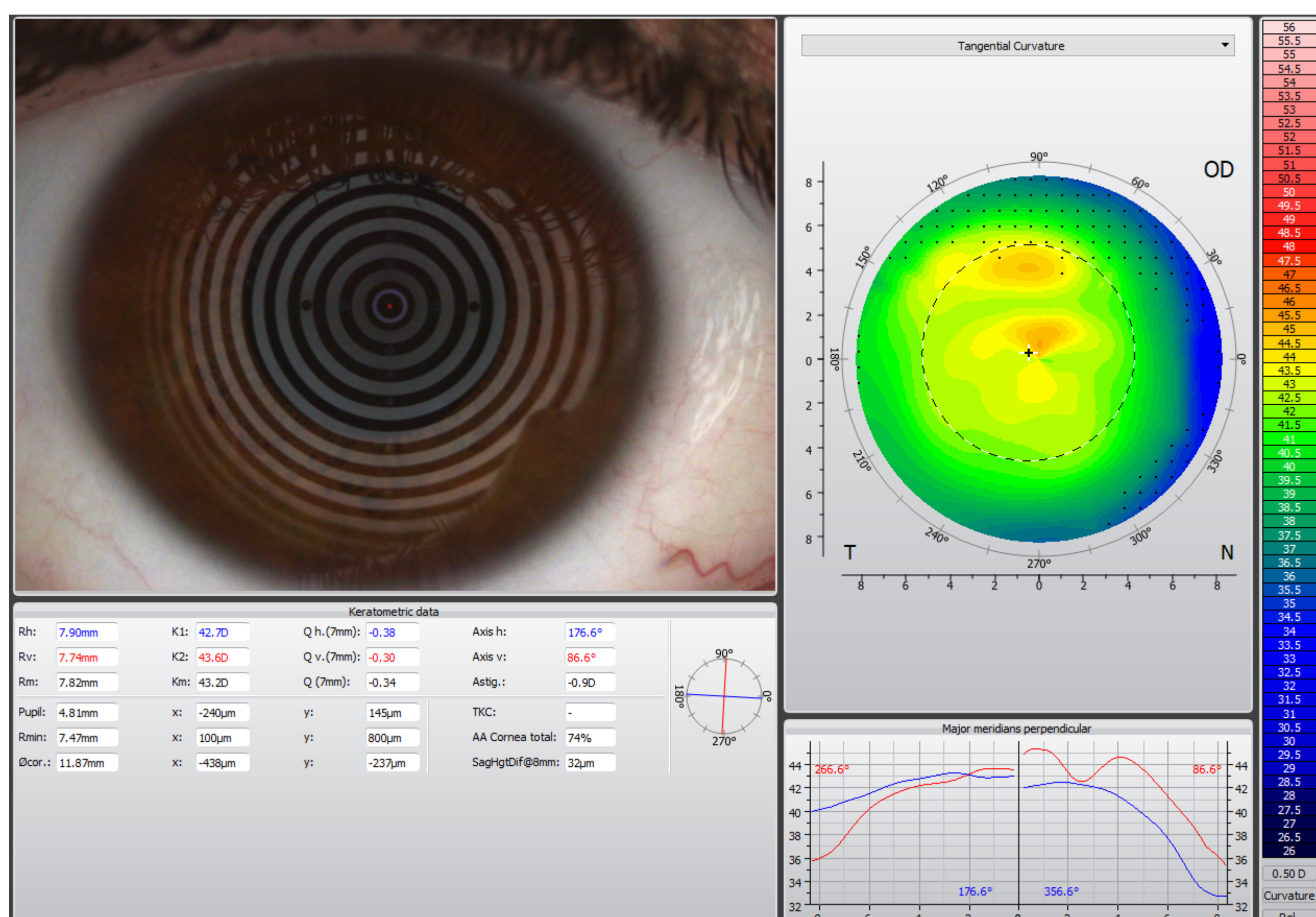


Image 1. Corneal topography from OCULUS Keratograph

Eaglet-Eye Eye Surface Profiler (ESP)

- Profilometry
- Fluorescein instilled in eye

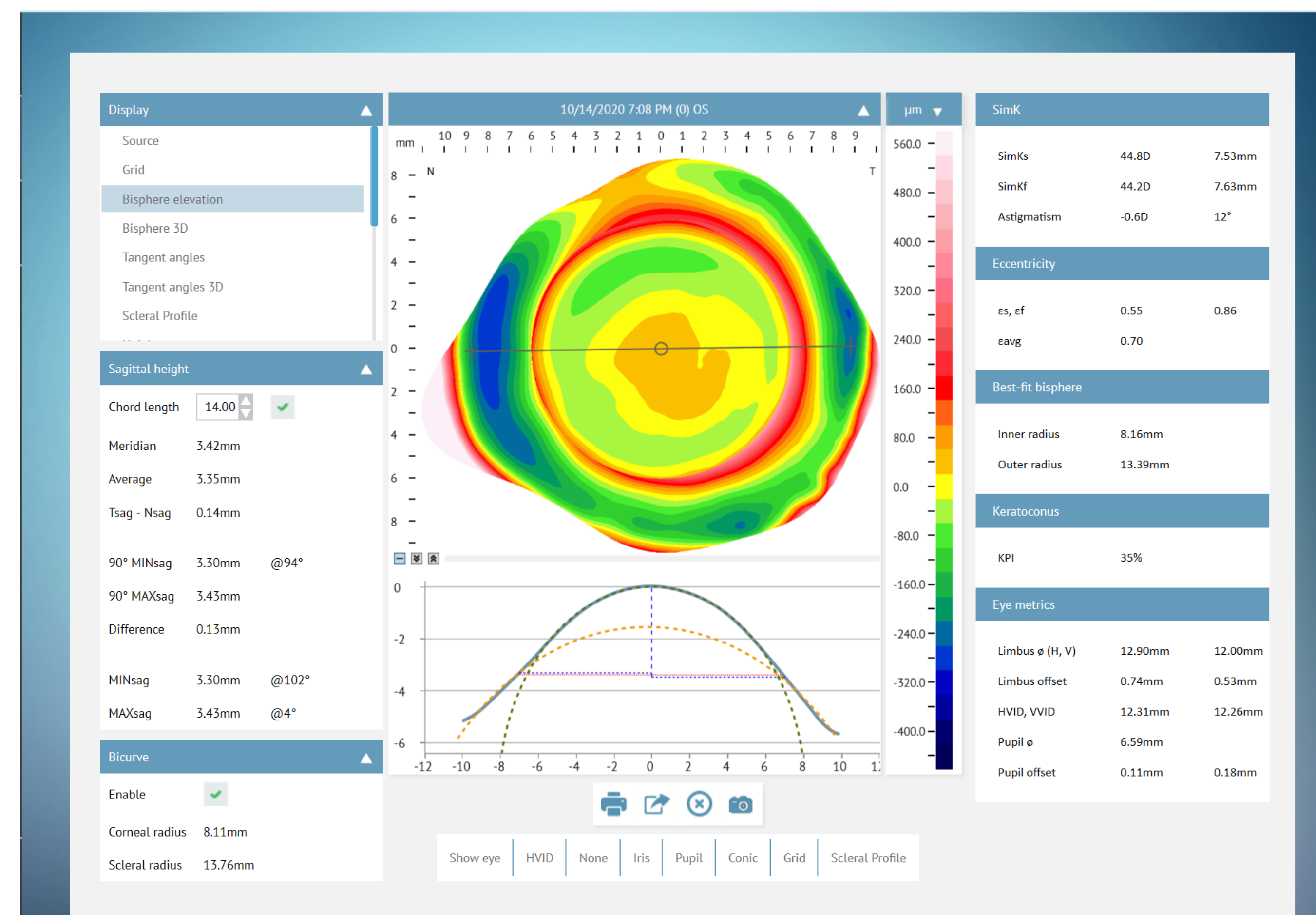
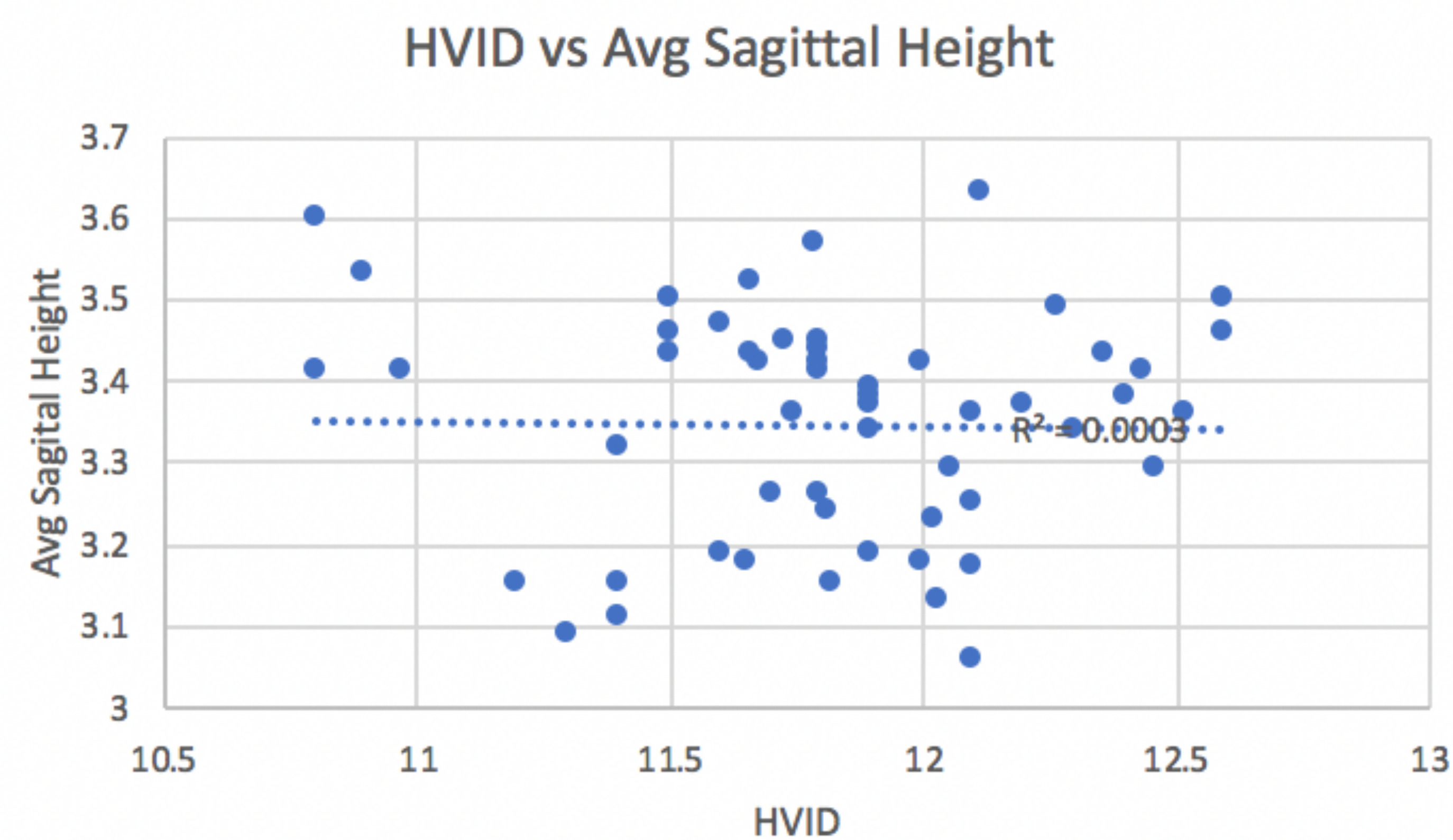


Image 2. Scleral and corneal shape data from ESP

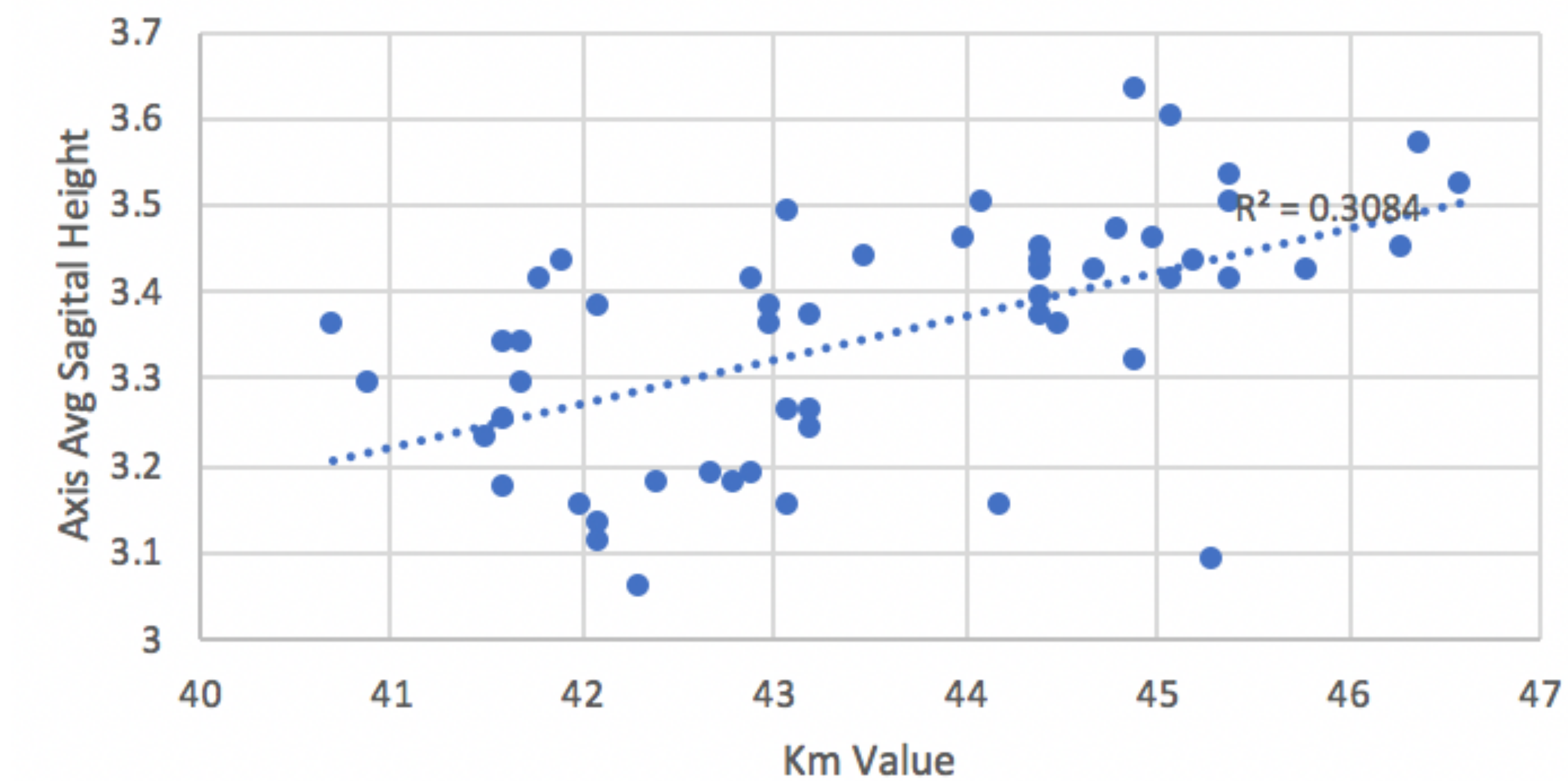
Results



Graph 1. HVID vs Avg Sagittal Height

The HVID vs sagittal depth scatter plot revealed an r squared value i.e. correlation value of 0.0009, indicating that the corneal diameter is of little value in determining the sagittal depth of an eye at a 14 mm chord (the area under an average soft disposable lens).

Km vs Avg Sagittal Height



Graph 2. Km vs Avg Sagittal Height

The Km versus sagittal height scatter plot revealed an r squared value of 0.3084, indicating a stronger correlation between cornea curvature and the depth of the eye at 14 mm.

Conclusion

This data indicates that sagittal height prediction is more closely related to the curvature of a cornea rather than the horizontal visible iris diameter. HVID was proven to have a correlation of r close to 0, or, no correlation when comparing data. Mean corneal curvature however showed a more positive correlation, suggesting it is the more useful parameter. While HVID is important when considering diameter of lens and coverage of the limbal zone, it falls short in determining the best fit lens for soft contacts.

If it is our desire to keep contact lens wearers happy in their lenses and avoid drop-outs among current and new lens wearers, then it is important to dispense well-fitting lenses. To achieve this outcome reliably, corneal curvature appears to be the more reliable measurement to select a lens with the appropriate sagittal depth over corneal diameter.

References

1. Young G. Why One Million Contact Lens Wearers Dropped Out. Contact Lens and Anterior Eye, 27 (2004) 83-85.