# Sagittal Depth Measured on One Subject by Seven Instruments

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## Introduction

Sagittal depth is a measurement that is increasingly being used by industry to define both the eye and the construction of contact lenses[1,2]. A wide variety of instrument technologies are available to eye care practitioners which provide corneal, limbal and scleral depth to guide lens selection[1]. This pilot study sought to compare the sagittal depth measurements between different clinically available instrumentation.

## Methods

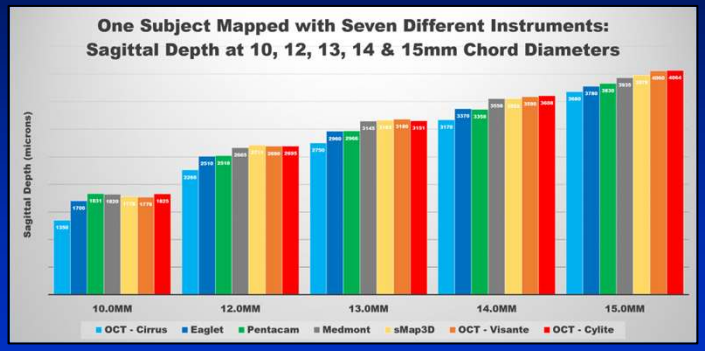
This pilot study was performed on a single subject with a normal, non-surgical, disease free, healthy eye. The right eye was imaged using seven different instruments which calculated sagittal depth:

| Reflection Instruments | Projection Instruments |
|---|---|
| Placido Disk Topographer<br>Medmont meridia Topographer | Tomographer<br>Oculus, Pentacam CSP |
| Profilometry<br>Eaglet Eye, Eye Surface Profiler<br>Visionary Optics, sMap3D | AS - Ocular Coherence Tomography<br>Cylite, HP OCT<br>Zeiss, Cirrus<br>Zeiss, Visante |

From each scan, the sagittal depth was measured across the 0/180° meridian at chords of 10, 12, 13, 14 and 15mm.

## Results

The sagittal depth data is displayed in microns on the graph below with all seven instrument findings grouped by the chord of measure in millimeters.




## Discussion

When comparing the minimum and maximum sags measured at each chord value, there was a mean difference of ~436 microns. This differential could be significant in contact lenses fit by sagittal depth. For instance, one instrument may select a specific sagittal depth where another instrument could suggest a sag over 400 microns different.

## Discussion (continued)

The Medmont, sMap3D, Visante and Cylite sag measurements were within 60 microns of each other through 4 of 5 chords. Additionally, the Medmont and sMap3D typically measured lower sag values and the Visante and Cylite generally higher values. Compared to these four instruments, the Eaglet and Pentacam were approximately 100-200 microns lower in measured depth through 4 of 5 chords but typically within 50 microns of each other. The Cirrus exhibited a lower measured depth through all chord diameters compared to the other instruments.

This study did not seek to determine which instrument is the most accurate for determining contact lens sagittal depth. Future research should expand the cohort size and test the measured sags in relationship to lenses placed on eye and evaluated for proper depth.

## Conclusion

Instruments measuring sagittal depth display a wide range of heights in this small pilot study. Further research is required to better understand the potential error each instrument possesses which may under or over-estimate the sagittal depth of contact lenses. Knowing the individual instrument bias could assist with contact lens fitting efficiencies in practice.

## References

1. Barnett M, Courey C, Fadel D, Lee K, Michaud L, Montani G, van der Worp E, Vincent SJ, Walker M, Bilkhu P, Morgan PB. CLEAR - Scleral lenses. Cont Lens Anterior Eye. 2021 Apr;44(2):279-288. doi: 10.1016/j.clae.2021.02.001. Epub 2021 Mar 25. PMID: 33775309.
2. Fujimoto et al, Enhancing Initial SCL Fitting Success Utilizing Sagittal Depth, Poster, Global Specialty Lens Symposium, Las Vegas, NV, January 2021

## Disclosures

Randy Kojima serves as a clinical advisor to Medmont International and is a partner in the KATT Design Group. Pat Caroline is also a partner in the KATT Design Group.