

Background

- Differences in scleral elevation can provide challenges when fitting patients in scleral lenses. Bi-elevation is an additional customization option on a ZenLens which aims to reduce lens decentration especially in instances of uneven limbal clearance. This is achieved by adding toricity to the limbal and/or mid-peripheral areas of the scleral lens as opposed to just the landing zone. Toric peripheral curves on a toric eye aligns one meridian, but does not allow the lens to fully align with the deeper meridian.
- Bi-elevation allows both meridians to be aligned independently and provide a more cohesive fit. Scleral lenses traditionally exhibit inferior decentration and this can further been seen in cases of keratoconic patients with inferior cones.
- Topography can be used to highlight areas of large changes in elevation and can help guide when bi-elevation may be needed and this design can be implemented in these cases to provide a better fitting lens.

Case Description

- Two pediatric patients presented to our clinical for specialty contact lens fitting.
- Patient 1 is a 15-year-old female with keratoconus in both eyes. Spectacle correction is +2.75 -4.50 x 088 with a BCVA of 20/40 in her right eye and +4.75 -5.75 x 083 with a BCVA of 20/30 in her left eye. Keratometry readings are 44.63/41.61 OD and 45.20/41.30 OS. Best corrected visual acuity was 20/20 OU after scleral lens fitting.
- Patient 2 is a 14-year-old male who was referred for a medical contact lens fitting due to his significant hyperopic spectacle prescription. His spectacle prescription is +9.00 -4.00 x 007 with a BCVA of 20/30 in his right eye and +8.75 -3.75 x 004 with a BCVA of 20/30 in his left eye. Keratometry readings were 42.66/37.59 OD and 42.27/37.50 OS. With scleral lens fitting he was able to achieve 20/25 vision OD. Vision was stable at 20/30 OS with scleral lens. Reduced BCVA we believe may be an amblyogenic factor.
- Both patients exhibited inferiorly decentered diagnostic lenses during fitting. Bi-elevation designs were applied to both patients' lenses to achieve optimal centration.

Lens Fitting

- Both patients were originally fit in alternative lens modalities. Patient 1 was initially fit with Duette hybrid lenses and Patient 2 was initially fit in a NovaKone lens.
- Both patients preferred the comfort and vision to the scleral lens trials in office and were subsequently refit into scleral lens modality.
- Toric peripheral curve fitting sets were used for both patients initial diagnostic lenses.
- OCT imaging and slit lamp observations were shared with consultation to aid design of bi-elevation scleral lenses.

CONCLUSION

- Integrating bi-elevation into scleral lenses allows for increased centration on eyes. This can be particularly useful in cases where lenses show good alignment on the edges but are still decentering.

Acknowledgments/References

- ZenLens Bi-elevation continuing education lectures

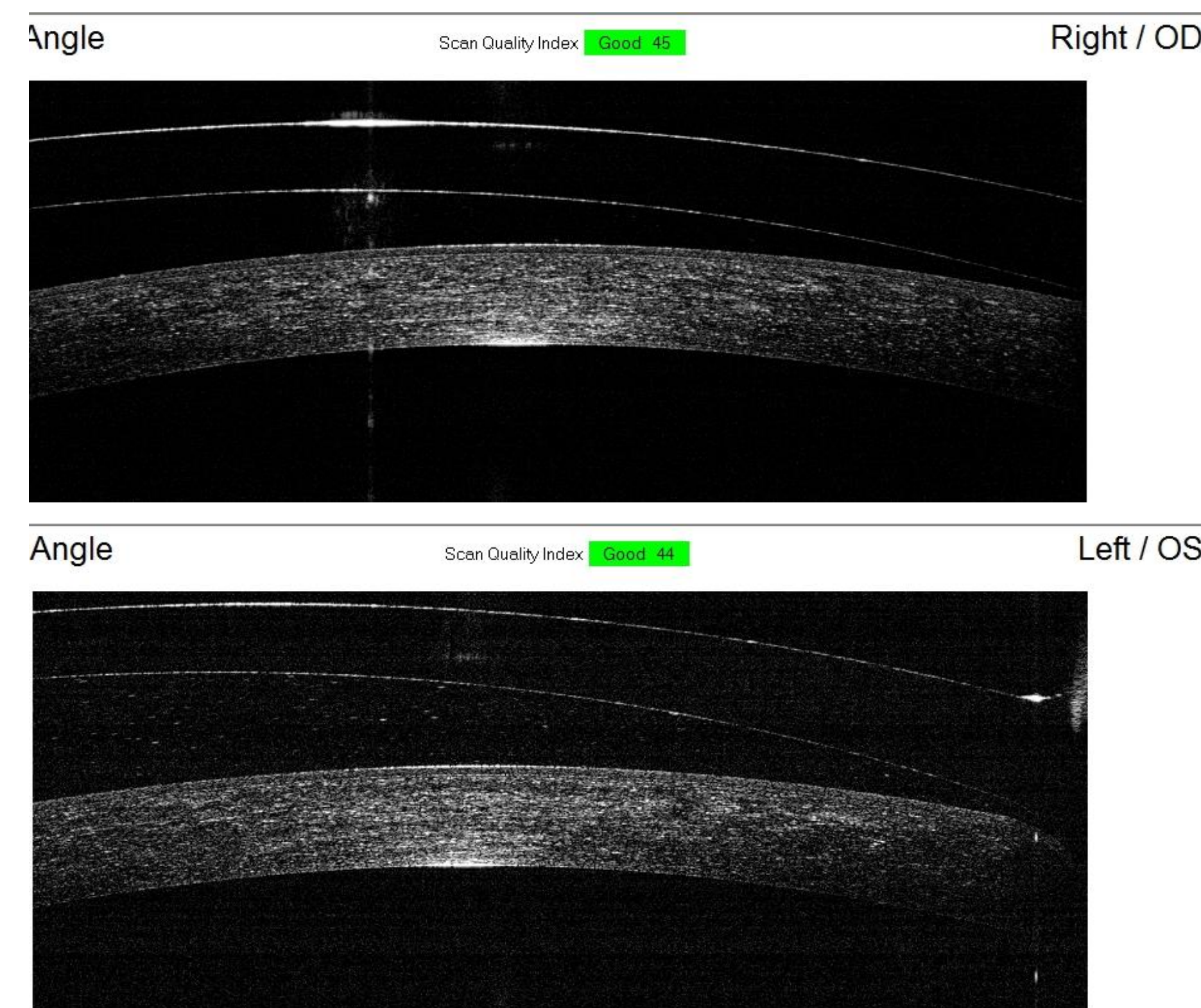
Patient 1

Initial Trial Lens Parameters Patient 1

	Brand	Trial Lens	Diameter	Sag	BC	APS
OD	ZenLens	ZT-9	17.0	4900	7.8	HF3/VS3
OS	ZenLens	ZT-10	17.0	5200	7.3	HF3/VS3

1st Lens Parameters

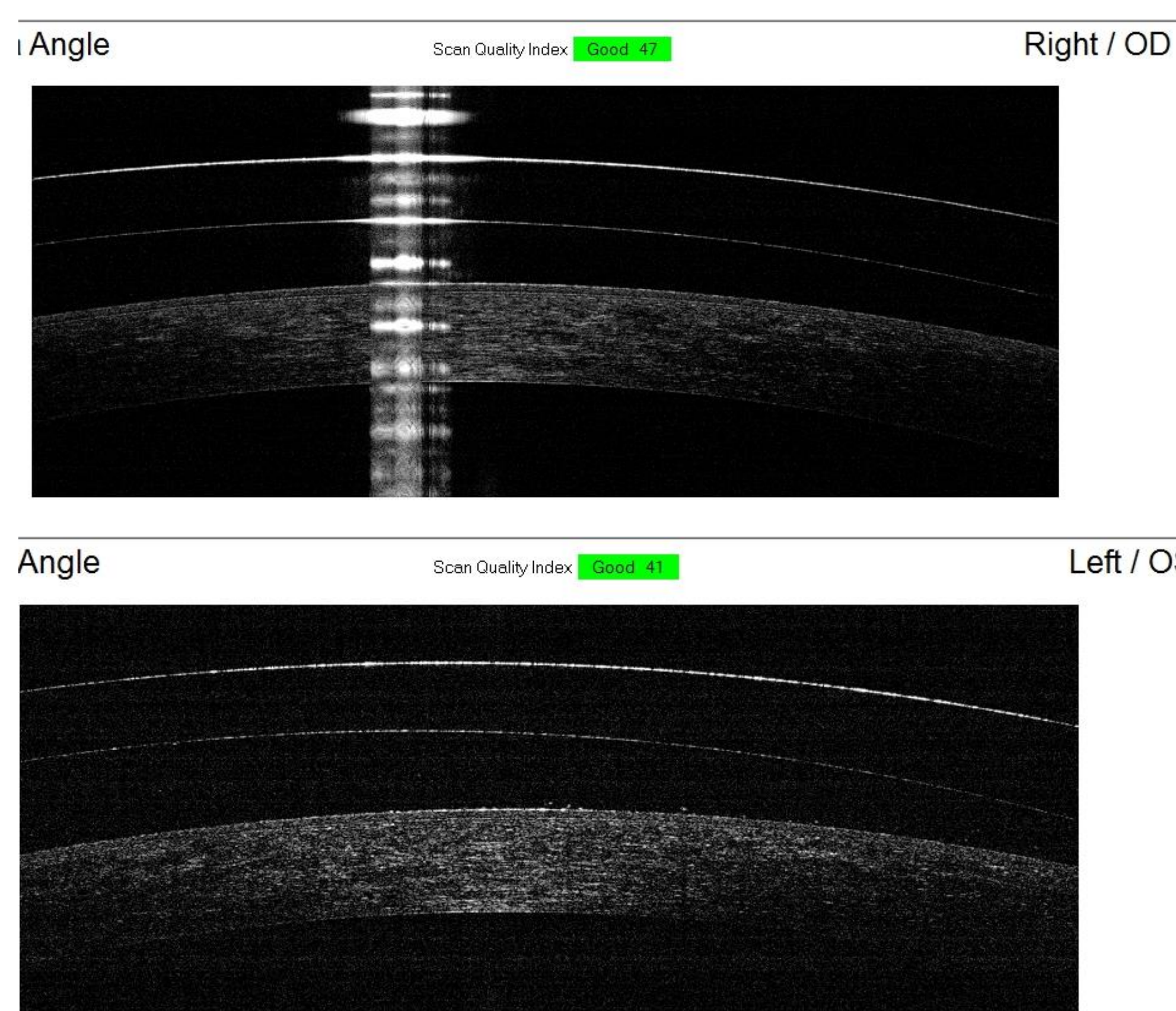
	Base Curve	Prescription	Vision	Sagittal Height	APS
OD	7.8	-5.25 -1.50 x 171	20/20	4800	HF2/VS4
OS	7.3	-7.00 -2.25 x 177	20/20 -2	5000	HF2/VS4



Initial lens fit: Note inferiorly decentered lens

Final Lens Parameters

	Base Curve	Prescription	Vision	Sagittal Height	APS
OD	7.8	-5.25 -1.50 x 171	20/20	H4900/V5100	HF5/VS0
OS	7.3	-7.00 -2.25 x 177	20/20	H4900/V5200	HF4/VS0



Bi-elevation design: Note increased centration compared to initial lens design

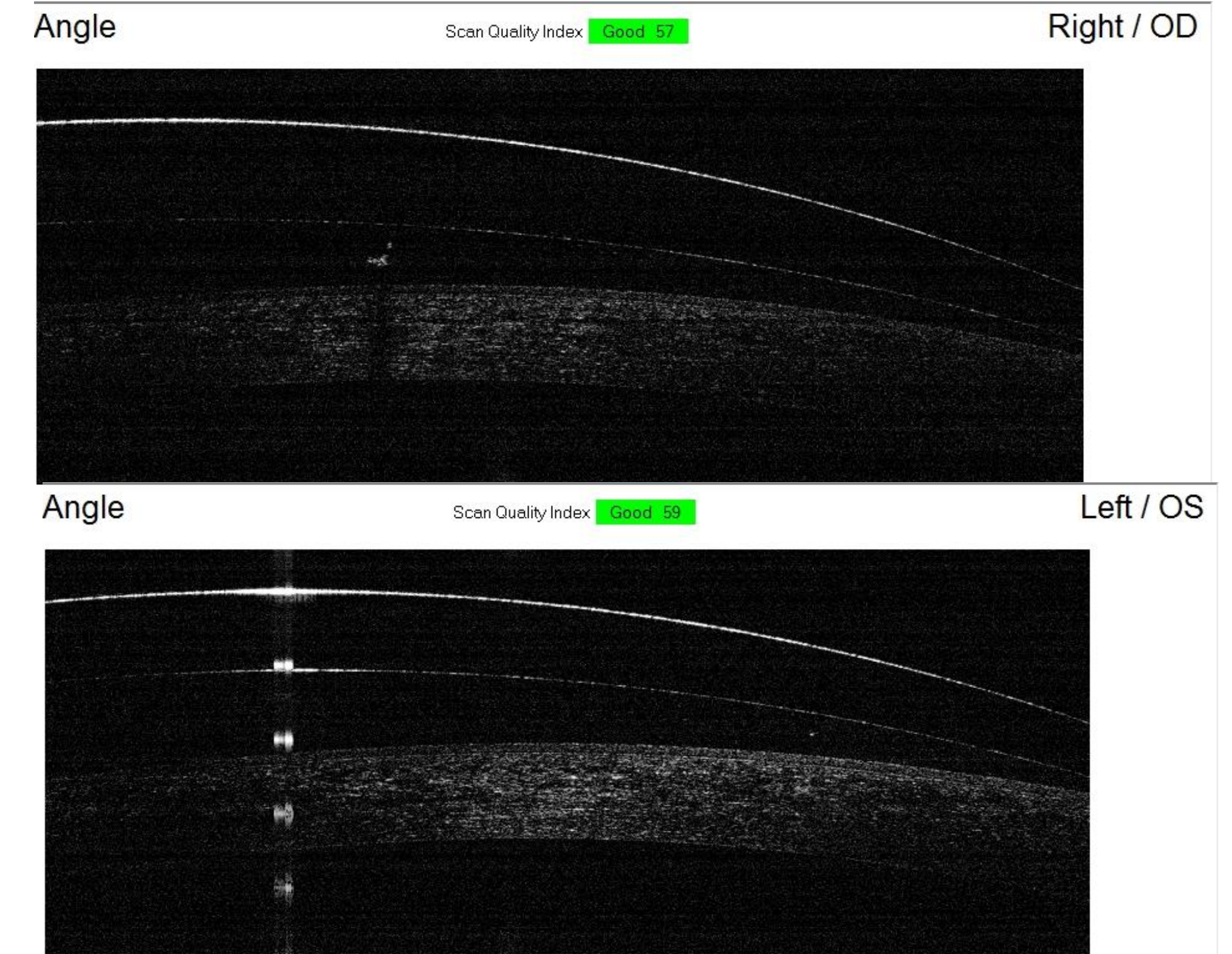
Patient 2

Initial Trial Lens Parameters Patient 2

	Brand	Trial Lens	Diameter	Sag	BC	APS
OD	ZenLens	ZT-8	17.0	4600	8.4	HF3/VS3
OS	ZenLens	ZT-9	17.0	4900	7.8	HF3/VS3

1st Lens Parameters

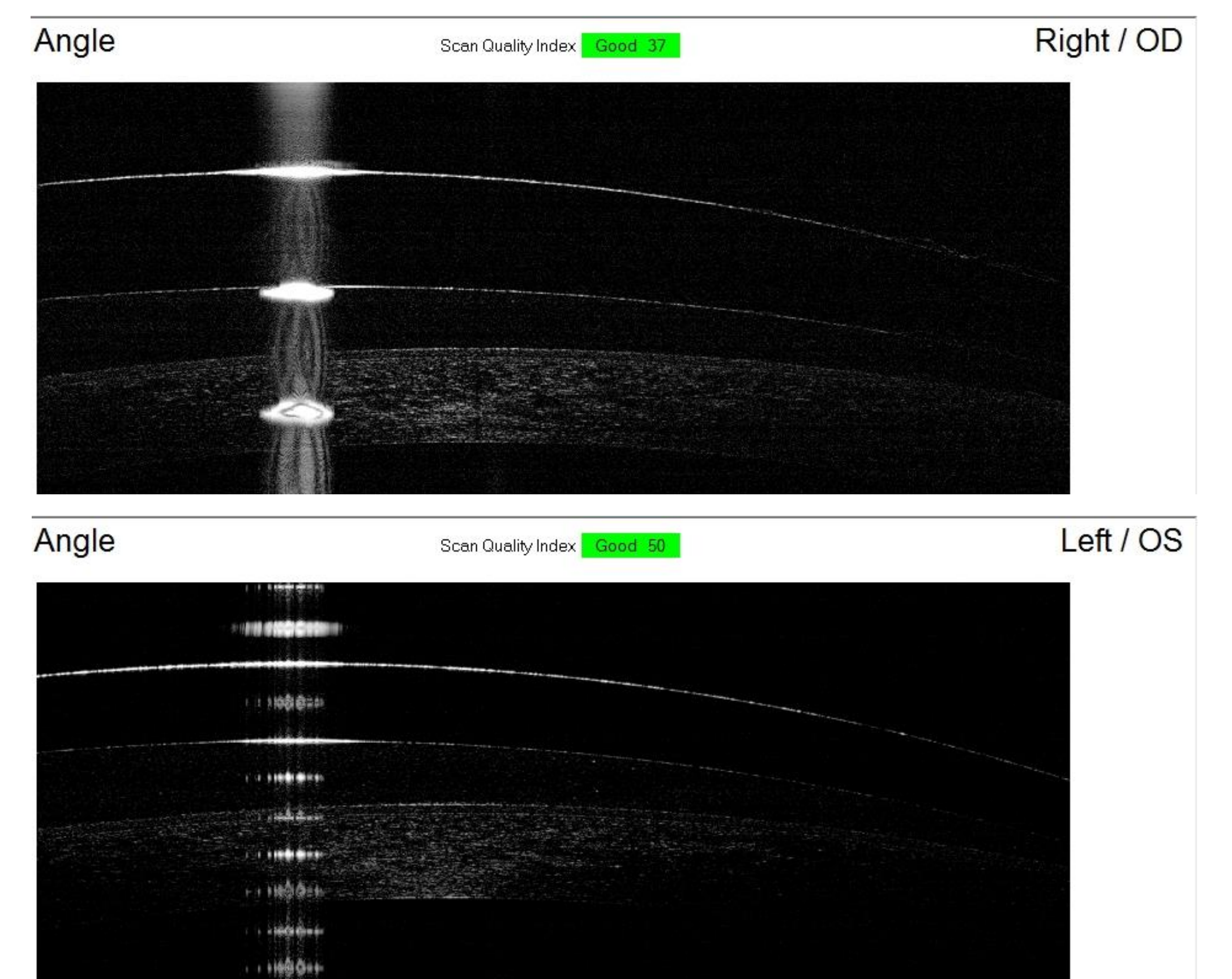
	Base Curve	Prescription	Vision	Sagittal Height	APS
OD	8.4	+7.25 sph	20/25 -2	4600	HF2/VS1
OS	7.8	+4.00 -1.25 x 010	20/60 +2	4700	HS1/VF2



Initial lens fit: Note inferiorly decentered lens

Final Lens Parameters

	Base Curve	Prescription	Vision	Sagittal Height	APS
OD	8.4	+7.50 sph	20/25	H4600/V4850	HF4/VF1
OS	7.8	+4.00 -1.25 x 010	20/30	H4600/V4850	HF2/VF4



Bi-elevation design: Note increased centration compared to initial lens design