

Goldilocks and the Three Sclerals:

Distance-Centered Multifocal Scleral Lens with Tangent Landing Zone Aids in Myopia Control of a High Myope with High Astigmatism

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Background

Degenerative myopia, also known as pathological myopia, is quite a *bear* to deal with. As axial length (AL) grows, ocular contents are stretched along with it, possibly leading to detrimental maculopathies.² This case report will showcase a 15-year-old with progressive degenerative myopia and presumed bilateral refractive amblyopia who was successfully fit with a custom, distance-centered (D-C) multifocal scleral lens (ScMCL), featuring front and back toricity and a new tangent edge design. AL was measured at each follow-up visit with the hopes that progression was mitigated by lens wear.

Getting Started

This patient presented to the NSU Health Eye Care clinic with a referral for myopia management. Prior medical records revealed the following: initial diagnosis of myopia at age 9, negative family history of myopia, and contact lens history of single vision extended range toric soft lenses for daily wear. Additionally, despite being on 0.05% low-dose atropine therapy for three years, myopic progression was documented every 6 months with the most recent spherical refractive progression being 1.00D OD and 0.50D OS.

Entering DVA (cc) with CLs	OD: 20/100-20/50 (Unstable) OS: 20/30-20/40
Habitual Soft Toric CLs	OD: -12.50-5.50x004 // 8.7 // 14.5 OS: -12.75-4.25x004 // 8.7 // 14.5
Cycloplegic Refraction	OD: -12.75-6.50x180 VA: 20/25 OS: -12.00-6.50x010 VA: 20/25 13mm vertex distance OU
Pupil Size (Ambient Lighting)	4.5mm OD/OS
Visible Iris Diameter	11.7mm OD/OS
Axial Length	29.62 mm, 28.77mm

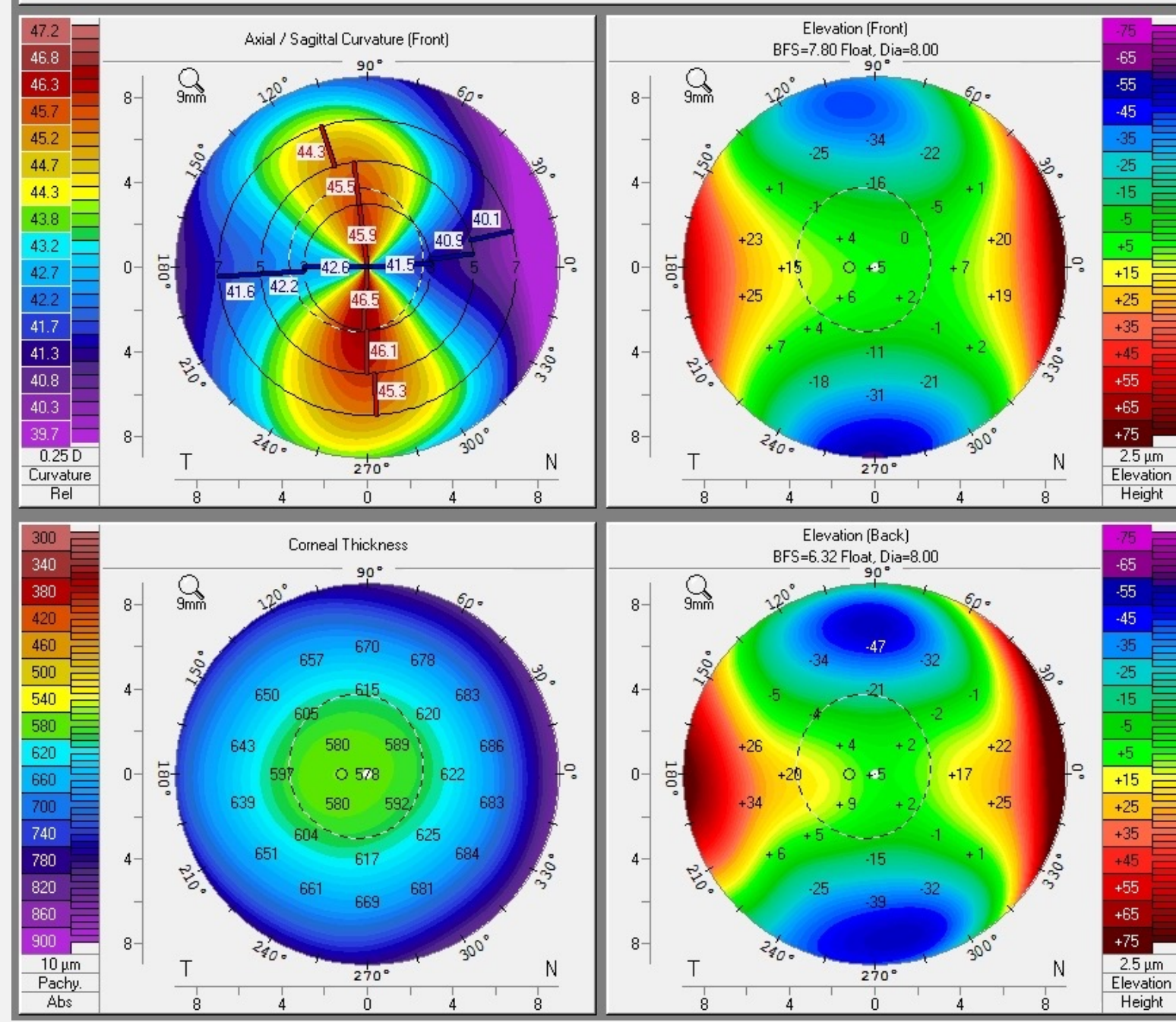
Baseline Findings Continued

Dilated Fundus Evaluation:

- Tilted optic nerve heads with tessellated fundus and snail-track degeneration
- No myopic choroidal neovascularization, lacquer cracks, Fuchs spots, retinal holes or tears

Corneal Tomography:

- OD shown (OS similar). Symmetric WTR bowtie with no signs of ectasia.
- Sim K's: 42.10 @ 180.5/
46.20 @ 090.5
- Thinnest Loci: 575 um



Scleral Contact Lens Fitting – Finding a Balance

Trial Lens #1: (3D D-C ADD, 1.5mm OZ) – Too Hot

OD: -13.37-1.62X178 // +3.00 // 7.85 // 16.50 // 200-micron BST
OS: -11.12-1.25x180 // +3.00 // 7.85 //16.50 // 200-micron BST
VA (cc): OD: 20/30, OS: 20/25, **Poor visual quality**
ORx: plano OD/OS

Trial Lens #2 : (Single Vision) - Too Cold

OD: -13.37-1.62X178 // +3.00 // 7.85 // 16.50 // 300-micron BST
OS: -11.12-1.25x180 // +3.00 // 7.94 //16.50 // 300-micron BST
VA (cc): OD: 20/25, OS: 20/25
Orx: OD: +0.75-0.75x075 VA: **20/20**, OS: -0.25 sph VA: 20/25+

Trial Lens #3: (2.50D D-C ADD, 2.5mm OZ) - Just Right

OD: -13.37-1.62X178 // +3.00 // 8.04 // 16.50 // 350-micron BST
OS: -11.12-1.25x180 // +3.00 // 7.85 //16.50 // 350-micron BST
VA (cc): OD: **20/20**, OS: 20/25, NVA: 20/15 OU

References

1: Yap A, Meyer JJ. "Degenerative Myopia". [Updated 2022 Sep 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: [https://www.ncbi.nlm.nih.gov/books/NBK574560/#:~:q=2%3AOhno-Matsui%20K%2C%20Kawasaki%20R%2C%20Jonas%20JB%2C%20Cheung%20CM%2C%20Saw%20SM%2C%20Verhoeven%20VJ%2C%20Klaver%20CC%2C%20Moriyama%20M%2C%20Shinohara%20K%2C%20Kawasaki%20Y%2C%20Yamazaki%20M%2C%20Meuer%20S%2C%20Ishibashi%20T%2C%20Yasuda%20M%2C%20Sugano%20A%2C%20Wang%20JJ%2C%20Mitchell%20P%2C%20Wong%20TY%2C%20META-analysis%20for%20Pathologic%20Myopia%20\(META-PM\)%20Study%20Group%20International%20photographic%20classification%20and%20grading%20system%20for%20myopic%20maculopathy%20Am%20J%20Ophthalmol.%202015%20May%20159\(5\):877-83.e7%3A%20Bullimore%20Mark%20A%20and%20Neel%20A%20Brennan.%20%22Myopia%20Control%20Why%20Each%20Diopter%20Matters%22%20Optometry%20and%20vision%20science%20-%20official%20publication%20of%20the%20American%20Academy%20of%20Optometry%20vol.%2036.6%20\(2015\)%20463-465.%20doi%3A10.1097/OPX.00000000000001367](https://www.ncbi.nlm.nih.gov/books/NBK574560/#:~:q=2%3AOhno-Matsui%20K%2C%20Kawasaki%20R%2C%20Jonas%20JB%2C%20Cheung%20CM%2C%20Saw%20SM%2C%20Verhoeven%20VJ%2C%20Klaver%20CC%2C%20Moriyama%20M%2C%20Shinohara%20K%2C%20Kawasaki%20Y%2C%20Yamazaki%20M%2C%20Meuer%20S%2C%20Ishibashi%20T%2C%20Yasuda%20M%2C%20Sugano%20A%2C%20Wang%20JJ%2C%20Mitchell%20P%2C%20Wong%20TY%2C%20META-analysis%20for%20Pathologic%20Myopia%20(META-PM)%20Study%20Group%20International%20photographic%20classification%20and%20grading%20system%20for%20myopic%20maculopathy%20Am%20J%20Ophthalmol.%202015%20May%20159(5):877-83.e7%3A%20Bullimore%20Mark%20A%20and%20Neel%20A%20Brennan.%20%22Myopia%20Control%20Why%20Each%20Diopter%20Matters%22%20Optometry%20and%20vision%20science%20-%20official%20publication%20of%20the%20American%20Academy%20of%20Optometry%20vol.%2036.6%20(2015)%20463-465.%20doi%3A10.1097/OPX.00000000000001367)

Follow-ups

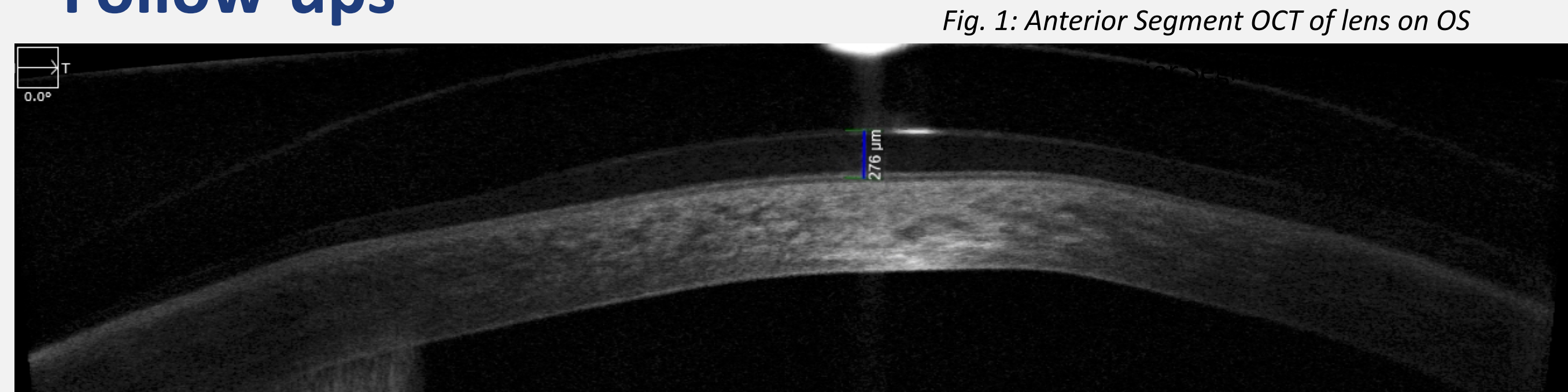


Fig. 1: Anterior Segment OCT of lens on OS



Fig. 2: Photo of Scleral Contact Lens

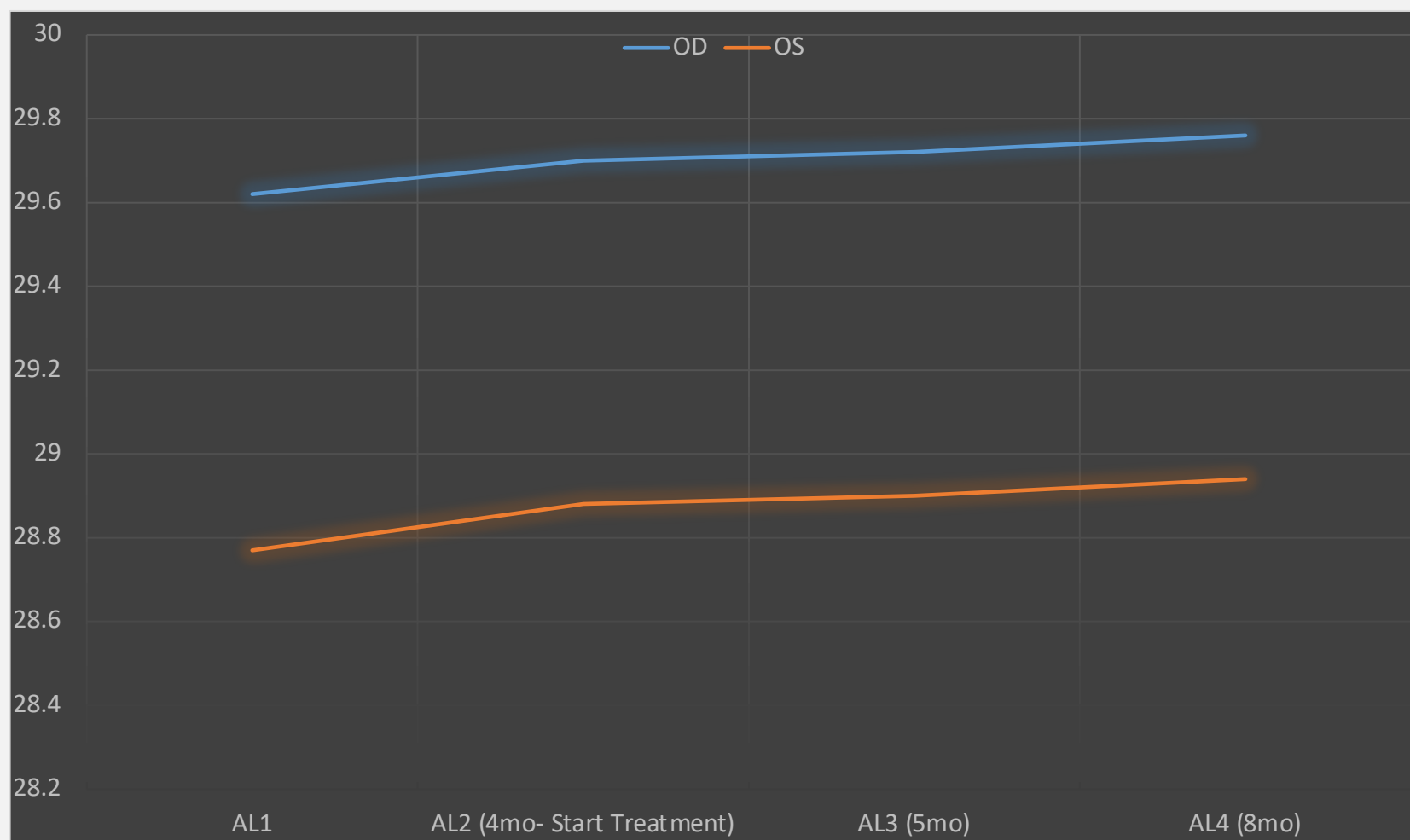


Fig. 3: Axial Length Progression

- Anterior OCT/Slit lamp evaluation showed adequate central and limbal clearance OU
- Anterior segment photo/slit lamp evaluation showed a well centered ScMCL free from vessel impingement OU
- AL measurements illustrates that progression occurred at a slower rate under treatment versus pre-treatment

Discussion

Pathological myopia is generally found in an eye that has a refractive error greater than -6.00D and/or an AL of 26.5mm or more.¹ As the AL increases, the eye is more at risk for ocular complications including staphyloma, lacquer cracks, retinal tears, glaucoma, cataracts, and myopic CNVMs.¹ A recent meta-analysis showed reducing myopia by 1D decreases maculopathy risk by 40%³, making myopia control a worthwhile consideration. Clinical modalities include low-dose atropine, multifocal contact lenses, orthokeratology, and myopia control spectacles. It is important to discuss with patients that some of these modalities are off-label and few studies support their efficacy in reducing the progression of pathological myopia.

Conclusion

Distance-centered multifocal scleral lenses are an option for progressive myopes with high amounts of corneal astigmatism. While further studies are needed to investigate the success of myopia control in degenerative myopes, this case report offers an example of improving vision and exploring myopia control in these cases.