NaturalVue Multifocal Contact Lens Fitting And Astigmatism

Published: April 9, 2021

The NaturalVue contact lens is a daily disposable soft multifocal lens for myopia control. The high safety profile of a daily disposable and wide power range available for the NaturalVue defines its role in the domain of myopia control options. Being an 'extended depth of focus' design, it is explained by its manufacturers Visioneering Technologies, Inc (VTI) to create a 'virtual pinhole aperture' with a wide range of simultaneous clear vision.

Typically spherical contact lenses (multifocal or not) are indicated only for low levels of astigmatism, and indeed the NaturalVue fitting guide advocates selecting patients with no more than 1D of astigmatism. This is ideal for first fit success. The more extensively detailed NaturalVue Professional Fitting and Information Guide, though, states that "The [multifocal] lenses may be worn by persons who exhibit astigmatism of 2.00 diopters or less that does not interfere with visual acuity."

This potential for correcting higher levels of astigmatism than is typical in spherical multifocal CLs is likely due to the unique optics of the NaturalVue lens, where the 'pinhole optics' may be partially correcting rather than masking astigmatism.

KG shared an interesting case study with the Myopia Profile Facebook community about managing astigmatism with NaturalVue lenses, and also how binocular vision can alter in contact lens fitting. We've broken KG's case study into a few parts. Let's start with the patient's profile.

> Molly (not her real name), a Caucasian female aged 14 with no family history of myopia, presented to me as a new patient in May, with progressive myopia of:
> R -8.00/-1.50x140 6/6-1 (20/20-1)
> L -9.50/-1.50x42 6/7.5+2 (20/25+2)
>
> She'd progressed by -1.50DS in the past year and was wearing SVD spectacles. Her local optometrist had fit her with SVD reusable soft contact lenses in the past, but after one inflammatory event a few years ago had discontinued CL wear since, and in the face of continued fast progression had referred Molly to me for other myopia control options.

Molly has high myopia and is a fast myopia progressor when compared with the average which is 0.59D per year.[1] Being a teenager also would lead one to expect slower rates of myopia progression. Hence, some form of myopia control treatment is definitely warranted.

High myopes are best in contact lenses

> My first words were "I want you to wear contact lenses again!" Molly was thrilled 😊 - forgetting myopia management for a second, that Rx needs CLs! CLs were obviously my first choice for myopia management too. Given Molly's history I was keen to fit her with daily disposables, so I trial fit the NaturalVue lenses in R -7.00 and L -8.00. I was keen to test if we could 'mask' the cyl as we've seen discussed in other cases, and as I've seen work a handful of times with my presbyopic NVue wearers.

Given the degree of her myopia, contact lenses would be an ideal form of optical correction as the magnification of the retinal image by contact lenses can help improve acuity. When it comes to myopia control, Molly's prescription is outside of the range of typical myopia control studies which usually include myopes up to 5-6D. The NaturalVue case series analysis, from which its myopia control efficacy was indicated, did include one participant of -8 and one of -10.[2] In the absence of more volume of data on higher myopes, though, 'typical' result cannot be expected and so both Molly and her parents should be advised that while there is no data on myopia control in such a high level of myopia, there is opportunity to try with an intervention which in all likelihood will provide better myopia control than a single vision correction.[2]

Due to a past contact lens-related inflammatory event when wearing reusable soft contact lenses (CLs), ensuring safety is of the utmost importance to Molly's confidence as a contact lens wearer, as well as confidence for her parents and practitioner. Hence, daily disposable CLs are the ideal choice due to their lower risk of infection or complication compared to reusable CLs.[3]

On immediate fit, Molly achieved OU 6/7.5-1 (20/25-1) and N5 at near. After another 20 minutes of settling time, she achieved OU 6/7.5+1 (20/25+1) and N4- at near. Her distance over-retinoscopy showed 0.75 cyls and near ret showed even less cyl (due to accommodation) so I was happy to let her go with them and asked her to see her local optometrist in 2 weeks for contact lens assessment and to reassess the residual cyl.

A letter back from Molly's local optom indicated that on review, the lenses were fitting well and Molly was comfortable; but the residual cyl had re-emerged and affected acuity, so she had prescribed over-specs with -1.25 cyls (same axes).

I saw Molly again for review this week and she's doing brilliantly - her refraction and axial length are stable. Weirdly (and luckily for her) her AXL is about 25.5mm R&L! She's super compliant with her cyl over-specs. Her BV is perfect in the contact lenses, and actually fine at near without the over-specs.

Initial contact lens fitting

At the initial fitting, Molly had relatively good vision and a low astigmatic over-refraction, which suggests that she could potentially rely on these contact lenses alone for optical correction. However, this changed over time and at the contact lens aftercare, she showed residual astigmatism and required over-specs to improve her visual acuity.

Surprisingly, her axial length ('AXL') was not as long as could be expected for her level of myopia - where 26mm is on average associated with around 5D of myopia.[4]

A lower axial length is very good news for Molly as the lifetime risk for vision impairment associated with myopia increases significantly for eyes longer than 26mm.[4] This reinforces the value of having axial length data to evaluate eye health risk in myopia.

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Were the correct trial lenses selected?

The NaturalVue Multifocal fitting guide includes the QuickStart Calculator which encourages practitioners to refract 'one step into the green' on Duochrome, and then enter this sphero-cylindrical refraction into the calculator to allow correction for vertex distance and trial lens selection.

KG cites starting with trial lenses of R (OD) -7.00 and L (OS) -8.00, which reflects vertex corrected power for the sphere component of Molly's refraction only. Entering Molly's full sphero-cylindrical refraction into the QuickStart Calculator results in suggested first fit lenses of R (OD) -8.00 and L (OS) -8.75. Perhaps the additional minus power in the trial lenses could have resulted in a different outcome regarding the astigmatism. Then again, perhaps Molly's oblique astigmatism may have needed full correction regardless, given that uncorrected oblique astigmatism can impact acuity more than at other meridians.[5]

> *"[Use] the NaturalVue Multifocal QuickStart Calculator... refract 'one step into the green' on Duochrome, and then enter this sphero-cylindrical refraction into the calculator for trial lens*

Molly's binocular vision (BV) status

Interestingly, Molly's BV in her glasses is a shocker! She becomes hugely esophoric and her divergent (BI) fusional reserves fatigue even with an add. She also has a +2.00 lag! This probably explains why she progressed so much in specs - some of which were historically SVD and some which had an add. Molly needed back up specs in her newest Rx, so I prescribed her PALs with a +1.50 Add - again, before considering myopia management we need to consider giving her comfortable vision, so she needs the add for her BV and it'll be better than SVD for myopia control, but I explained that she'll likely be more comfortable studying in her CLs.

2 eso in CLs and 8 eso in specs (SVD)!

An unusual aspect of this case is that Molly is a very high myope with no family history of myopia, and of an ethnicity typically associated with lower levels of myopia.[6]

The state of her binocular vision with spectacle correction could potentially be the answer. Having spent most of her time in single vision spectacle lens correction, the high amounts of esophoria and accommodative lag could potentially have contributed to her fast myopia progression. Read more about this in Four reasons why binocular vision matters in myopia management.

Aside from myopia correction and the potential for myopia control, a third benefit of Molly wearing CLs is the effect on her BV. Typically, myopes changing from spectacles to contact lenses will exhibit an exophoric shift, which is ideal for an esophore. This effect has been demonstrated in single vision corrections, and is typically greater for higher levels of myopia. Read more about this in our blog Specs to contact lenses - what happens to binocular vision? In addition to this expected response, one research abstract has indicated that the NaturalVue multifocal may create a small additional exophoric shift compared to a single vision contact lens.

"Aside from myopia correction and the potential for myopia control, a third benefit of Molly wearing [NaturalVue Multifocal] contact lenses is the effect on her binocular vision."

Take home messages

This case illustrates the interesting challenges of managing patients outside of the typical realm of myopia control - in this case a high myope. It also highlights the dynamics of the visual system, and also raises the point about following fitting guides to achieve best possible outcomes. KG has succinctly summarised the main take home messages below, although keep in mind that 'masking' astigmatism is more correctly expressed as 'partially correcting' with the NaturalVue multifocal contact lens.

1. 'Masking' cyl with the NaturalVue may work, but may change over time.

2. Over-specs are a valid option to be able to stick with daily disposables and optimise safety - and for a 14 year old the fashion element of specs (with thin lenses!) has helped with compliance.

3. While Molly's high myopia is outside the typical range typically included in myopia control studies, the NaturalVue lenses have worked a treat for her (at least over this first 5 months) and it's also interesting to think how much her BV could have driven her progression in specs, given she has no family history.

This educational content is brought to you thanks to unrestricted educational grant from

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