

# Solving the Toric Puzzle

*Patients and practitioners benefit from prescribing toric contact lenses, but rotational stability, comfort, and other features must be taken into consideration*



## KEY INSIGHTS:

- 47% of the vision corrected population would benefit from toric contact lenses, but many are still prescribed spherical contact lenses.<sup>1-3</sup>
- Toric contact lenses provide better outcomes, in terms of visual acuity, visual performance, and higher visual quality of life, for patients with astigmatism.<sup>4-13</sup>
- Eyelid Stabilised Design toric lenses are more stable during large versional eye movements, less affected by gravity, and help keep vision clear and stable all day long – even for people with an active lifestyle.<sup>19-23</sup>
- Vertical prism in the optic zone of a toric lens could negatively affect patients with monocular astigmatism. Eyelid Stabilised Design lenses do not have vertical prism in the optic zone and have significantly less base down prism than most competitor toric soft contact lenses.<sup>24\*</sup>
- The majority of astigmats (74%) who had previously dropped out of contact lens wear can be successfully re-fitted with current toric soft lenses.<sup>8</sup>

Nearly half (47%) of vision-corrected patients have visually significant ( $\geq 0.75$  D) astigmatism in at least one eye.<sup>1</sup> Yet, contact lens prescribing data shows that the ratio of soft toric contact lens fits in many countries are much lower than would be expected given the prevalence of astigmatism. For example, only 21% of UK wearers are fitted with toric soft contact lenses.<sup>2</sup> (Fig 1)

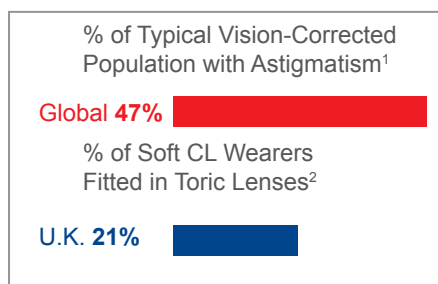


Fig 1: Soft toric CL growth potential

It remains very common for astigmats to be prescribed spherical-only contact lenses. This may be due to practitioners opting against torics for low astigmats, either in an effort to save the patient money or, perhaps, to avoid the perceived hassles associated with toric lenses.

Researchers in one study found, for example, that contact lens astigmatic powers were more likely to be 1.00 DC or greater, while the majority of spectacle lenses had astigmatic power of 0.75 DC or less ( $p < 0.0001$ ).<sup>3</sup>

The attempt to mask low levels of astigmatism may be misguided. Numerous studies have now shown that astigmats – including those with low levels of astigmatism – achieve superior outcomes with toric contact lenses compared to spherical lenses. For example, subjective acuity, and objective high- and low-contrast visual acuity can all be improved with toric contact lenses compared to spherical lenses.<sup>4-7</sup> Even patients with just 0.75 D of astigmatism, which is thought by many clinicians to be easily masked, can see gains of a half to a full line of Snellen visual acuity with toric lenses.<sup>4,8</sup> (Fig 2)

The presence of astigmatism can lead to substantial reductions in visual performance across a variety of functional visual tasks.<sup>9</sup> For example, uncorrected astigmatism reduces visual comfort while using a computer<sup>10</sup> and can reduce reading speeds by up to 24%.<sup>11</sup>

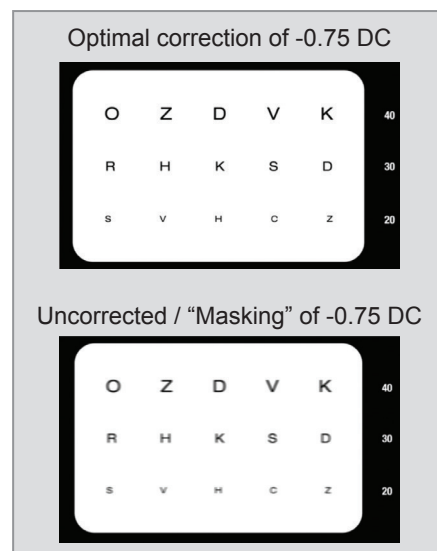


Fig 2: Uncorrected astigmatism results in reduced visual acuity

Cox et al compared astigmats' performance in toric and spherical contact lenses in an immersive, virtualreality driving simulator. Wearing the toric lenses led to significantly safer tactical driving performance ( $p < 0.05$ ) compared to spherical lenses – an effect similar to that seen when comparing sober vs. intoxicated drivers in the simulator.<sup>12</sup>

\*Vertical heterophoria possibly caused by prism dissociation due to the presence of induced optical prism is a relevant factor for practitioners to consider when fitting toric contact lenses for monocular astigmats or those requiring a mix of toric soft contact lens designs. Clinical studies have not been done to fully characterize the clinical effects of differences in base down prism among different contact lenses.

**Patient-Reported Outcomes**

NEI-RQL-42 Questionnaire/Subscale	Toric Contact Lens	Spherical Contact Lens	p
Overall visual quality of life	75	68	0.006
Clarity of vision	76	50	0.006
Satisfaction with correction	80	62	0.006

**Fig 3: Patient-reported visual quality of life in toric vs spherical contact lenses<sup>13</sup>**

Visual quality of life impact

Perhaps not surprisingly, given the importance that people assign to vision, researchers recently found that full correction of astigmatism may help improve patients’ visual quality of life.<sup>13</sup> Sixty adult contact lens wearers (mean age, 27.5 years) with -0.75 DC to -1.75 DC were randomly assigned to either a toric or spherical soft contact lens from the same lens family and masked to treatment assignment.

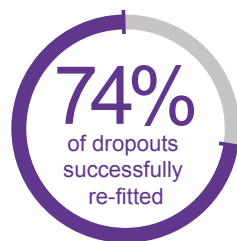
After five days of wear, subjects completed the National Eye Institute Refractive Error Quality of Life Instrument (NEI-RQL-42), a validated patient reported outcomes (PRO) questionnaire, as well as a modified convergence insufficiency symptom survey (CISS). Subjects were then fitted into the alternative lens and surveyed again after five days of wear with that lens. The researchers found that patients fared better in toric lenses on overall visual quality of life (p=0.006), clarity of vision (p=0.006), and satisfaction with correction (p=0.006).<sup>13</sup> (Fig 3) Additionally there was a 15% reduction in convergence insufficiency symptoms in the toric lenses (p=0.02).

Retaining astigmats

Historically, astigmats have been more likely than others to drop out of contact lens wear, with 65% of dropouts having ≥0.75 D of astigmatism in at least one eye.<sup>14,15</sup> While some of this attrition may be related to lens-related discomfort (the leading reason for dropout overall), there is also evidence to suggest that

dissatisfaction with vision, due either to uncorrected astigmatism or rotational instability of toric lenses, may be to blame in many cases.<sup>16,17</sup> In a recent multicenter, retrospective chart review of new contact lens wearers in their first year of wear in the U.K., Sulley et al found that toric lens wearers were much more likely than spherical single-vision lens wearers to cite poor distance vision as a reason for dropping out of contact lens wear.<sup>17</sup>

The good news is that the majority of astigmats (74%) who had previously dropped out of contact lens wear can be successfully fitted with current toric soft lenses.<sup>8</sup> (Fig 4) By prescribing toric lenses that meet patients’ needs for consistent vision and comfort, practitioners can help astigmats enjoy better vision and return to or maintain successful contact lens wear.

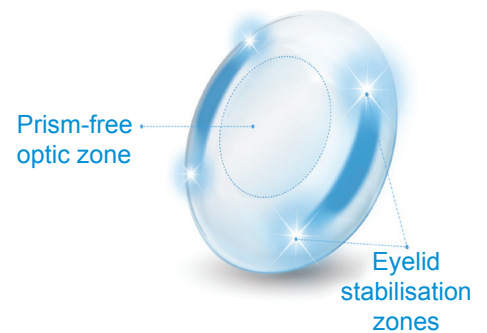


**Fig 4: 74% of astigmats who had previously dropped out of contact lens wear can be successfully fitted with current toric soft lenses<sup>8</sup>**

Factors to consider in prescribing toric soft lenses include the rotational stability of the lens, performance in challenging situations, amount of prism induced when astigmatism is corrected in one eye, comfort, and fitting success.

Rotational stability

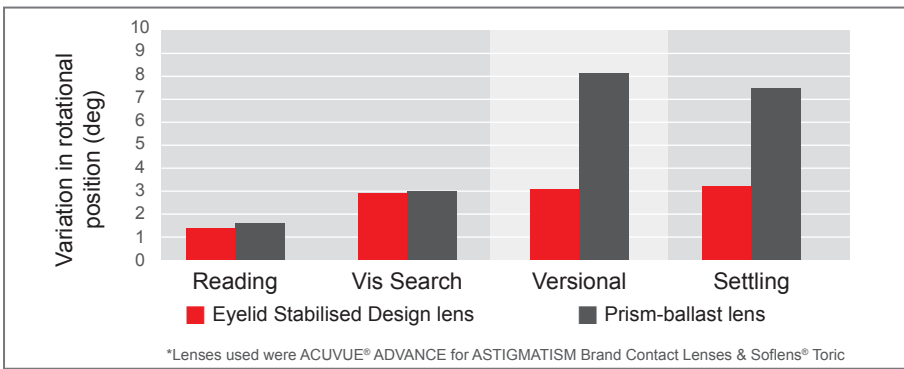
Contact lenses are designed to remain mobile on the pre-corneal tear film. However, this poses a problem for the accurate and consistent correction of astigmatic error. If the lens rotates out of position, away from the intended axis, vision may be blurred until the lens returns to the correct position. Lens manufacturers have approached the challenge of maintaining a predictable and stable lens orientation in several different ways. The first soft toric contact lens designs involved prism-ballast, where the entire inferior portion of the lens was much thicker, leveraging gravity to pull the weighted portion of the lens down to orient the lens. Since then, modified lens weighting with periballasted lenses or the use of differential thickness profiles (dual-thin-zone) have improved toric lens performance.<sup>16,18</sup>



**Fig 5: The Eyelid Stabilised Design**

These designs may still be challenged by eye and head movements outside the consulting room. On the other hand, toric lenses with Eyelid Stabilised Design are horizontally symmetrical, with four stabilisation zones (Fig 5) that use the natural force of blinking to quickly orient and stabilise the lenses within minutes of initial insertion, and then realign naturally with every blink.<sup>19</sup> Eyelid Stabilised Design, which is available in all ACUVUE® Brand Contact Lenses for ASTIGMATISM, has been shown to help provide clear and stable vision throughout the day, even with extensive head and eye movements.<sup>19-22</sup>

For example, Eyelid Stabilised Design lenses have been shown to be more stable than tested prism-based designs during lens settling and large versional eye movements.<sup>22</sup> (Fig 6)



**Fig 6: Eyelid Stabilised Design lenses are more stable during settling and versional movements<sup>22</sup>**

While the latter may often be associated with sports, common everyday activities such as looking over one’s shoulder while driving also require large eye movements. When subjects are lying down, Eyelid Stabilised Design lenses rotate approximately 50% less and provide a half-line better logMAR visual acuity compared to three other toric lenses without this design.<sup>21,23</sup> (Fig 7)

Prismatic effects

Toric lenses with Eyelid Stabilised Design may also provide an advantage in having no vertical prism in the optic zone.<sup>24</sup> A recent study quantified that the amount of vertical prism in the central 6.0 mm of prism- and peri-ballast toric lenses ranged from 0.52Δ to 1.15Δ base-down vertical prism, while it was nearly 0.00Δ for the Eyelid Stabilised Design lenses tested.<sup>24</sup> (Fig 8)

Vertical prism in the optic zone of a toric contact lens is generally well tolerated when fitted to both eyes but could negatively affect patients with monocular astigmatism.\*

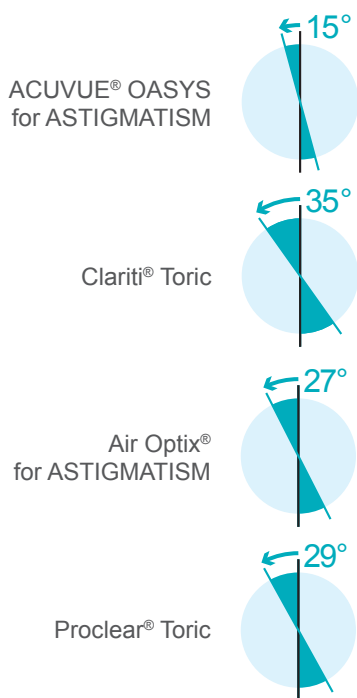
A vertical prism disparity of >0.5Δ between the eyes has been associated with symptoms such as nausea, headache, and discomfort and could decrease stereopsis in some patients.<sup>24,25</sup>

Clinicians should be aware of this when prescribing for monocular astigmatic patients or responding to complaints of such symptoms.

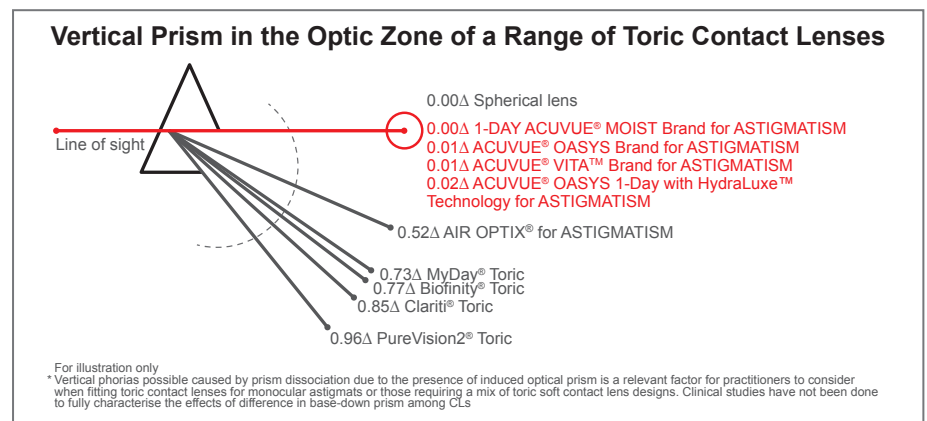
Comfort

Patients’ subjective ratings of contact lens comfort are influenced by many factors, including tear film quality and quantity, lens wettability, lens edge profiles and thickness, and visual comfort or the degree of eye strain. We know that more than half of toric contact lens wearers (58%) experience declining performance over the course of a single day of wear.<sup>26</sup> In this survey, conducted among 18- to 39-year-old toric contact lens wearers (n=208) who completed digital check-ins on their smart phones every 2 hours, the “performance” metric combined comfort, satisfaction, and vision quality. The pattern of declining comfort was associated with more activities and more changes in environment throughout the day, and was similar to the rate of declining performance reported with spherical lenses.<sup>27</sup>

Because of the extra challenges to performance of toric lenses (such as the potential for lens rotation or increased thickness), practitioners may want to take extra care to choose lens materials with advanced wetting technologies and proven success on comfort, use a toric lens design less influenced by gravity or switch patients to modalities with shorter replacement schedules.



**Fig 7: In all cases, Eyelid Stabilised Design lenses rotated approximately 50% less and gave half a line better logMAR VA<sup>21,23</sup>**



**Fig 8: Vertical Prism in the Optic Zone of a Range of Toric Contact Lenses**

## Talking about torics

It is important to proactively talk about toric contact lenses with vision-corrected patients who have astigmatism. Because they don't necessarily understand astigmatism or know about the potential for correcting it with toric lenses, astigmats may not specifically ask for toric contact lenses during their exam or consultation.

Surveys show that nearly 4 in 10 patients (38%) say they don't know what astigmatism is and more than half (57%) respond "no" or "don't know" when asked whether astigmatism can be corrected by contact lenses.<sup>31</sup> Among astigmats who don't wear contact lenses, many don't believe they can. Another study found that when astigmatic contact lens wearers were asked why they weren't wearing toric lenses, cost was not the primary reason. More than one-quarter (28%) said they were unaware that toric lenses existed and a little under (22%) didn't even know they had astigmatism.<sup>32</sup> Clearly, there is an opportunity to exceed expectations for both contact lens and spectacle wearers who aren't aware they could be candidates for toric contact lenses to fully correct their refractive error.

When patients are made aware of the benefits of astigmatic correction, they will choose soft toric lenses, even when that means a higher price. In a bilateral, subject-masked, randomized crossover clinical trial, 60 habitual U.S. contact lens wearers (mean age 27.5 years) wore daily disposable etafilcon A lenses with and without astigmatism correction, for one week each.<sup>33</sup> The subjects' prescriptions ranged from +4.00 to -9.00 DS and all of them had astigmatism, ranging from -0.75 to -1.75 DC. Of the 55 subjects with a preference, 78% preferred the toric lenses and nearly all (96%) were willing to pay more for the toric lens. (Fig 9)

Fig 9: Nearly 8 in 10 astigmats prefer toric lenses<sup>33</sup>



### Clockwise Add; Anti-clockwise Subtract (CAAS) Method

- Determine the amount and direction of rotation
- If lens rotates **Clockwise**, **Add** the amount of rotation to the spectacle axis
- If lens rotates **Anti-clockwise**, **Subtract** the amount of rotation to the spectacle axis



Fig 10: Lens orientation assessment

### Pearls for success

One way to increase awareness among astigmats about the availability of toric contact lenses is simply to start by showing spectacle-corrected or spherical lens wearers how much the cylinder component of the prescription could help improve their visual acuity and vision performance.

Next, starting with a new refraction, determine the trial lens power. If the cylinder falls between two available options, choose the lower cylinder power. Also adjust for vertex distance, if applicable. Fit the trial lens, assess visual acuity and lens fit, and prescribe accordingly.

If troubleshooting is required, assess the lens fit, orientation, and stability and adjust for lens rotation if needed. Practitioners may want to use the CAAS (**C**lockwise **A**dd, **A**nti-clockwise **S**ubtract) method, also known as the LARS (**L**eft **A**dd, **R**ight **S**ubtract) method for making adjustments to the lens axis. (Fig 10) For example, if the patient has a prescription of -3.00 -1.75 x 180 and the lens is rotating clockwise by 10°, the new prescription would be -3.00 -1.75 x 10. The new lens should orient to the same position as the first lens, but the astigmatic correction will now be in the desired axis.

It's also important to check with those who are already wearing toric lenses, to make sure their current lenses are meeting their vision and comfort needs. Patients may not complain about problems with fluctuating or blurry vision for fear that the practitioner will tell them that they can't wear lenses.

Unfortunately, this sets up a situation in which the practitioner makes assumptions that the patient is satisfied with their current correction – and the patient assumes that if the practitioner had anything better to offer, he or she would have brought it up.

### Conclusion

Modern toric contact lenses have improved tremendously in recent years, with better designs and availability in a wide variety of materials and replacement schedules.

Most astigmats who are in non-toric contact lenses can see improvements in visual acuity and performance by switching to lenses that correct their astigmatism. Even among those who have previously dropped out from toric contact lens wear in the past, studies suggest that refitting in a different material, modality, or alternative design with a different method of rotational stabilisation can be successful.



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