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The Real World of Toric Contact Lens Wear

Addressing everyday situations in the consulting room can lead to more successful toric soft lens fitting. Dr Kurt Moody and Ella Ewens review toric soft lens fitting and discuss evaluating these lenses in practice with three UK practitioners.

Approximately one-third of potential contact lens wearers require astigmatic correction, according to a recent analysis of 11,624 spectacle prescriptions.[1] Young and colleagues determined that 47% of patients have clinically significant astigmatism (≥0.75D) in at least one eye. For myopes the incidence is higher still, 55% in at least one eye. The percentage of people who have higher amounts of astigmatism (≥1.00D) is lower, but still significant, with a prevalence rate of 31.8% in at least one eye and 15% in both eyes.

While soft toric fitting trends seem to be catching up with prevalence, industry data suggests that only one in five (20%) soft contact lens fits in the United Kingdom in 2011 was a toric lens fit.[2] Worldwide, prescribing trend data suggests a higher rate, with more than 35% of all soft lenses prescribed are soft toric lenses.[3] It is possible that practitioners responding to this survey have a higher level of interest in contact lenses and may be more likely to prescribe toric lenses. However, this still falls short of the potential level if all astigmats are fully corrected. This may be in part due to lack of awareness amongst patients of the availability of contact lenses that correct astigmatism. Ian Cameron, an optometrist who practices in Edinburgh, says "Astigmats are often told 'you can't wear contacts' – and nothing brings me greater joy when I hear this!

TOP TIPS FOR REAL WORLD SUCCESS FITTING TORIC SOFT LENSES IN PRACTICE

- Recommend toric soft lenses to all astigmats to benefit from vision as good as their spectacles, whether new or lapsed wearers, or current lens wearers in spherical lenses
- Question patients about their lifestyle and hobbies, and ask which activities can lead to their lenses rotating or becoming unstable
- Assess lens performance with simulated real world tasks where eye and head movements may cause rotation or instability
- Assess lens rotation in oblique positions of gaze
- Use objective and subjective assessments of vision

Of course they can, and with only a little more effort needed than fitting a spherical patient. They are delighted that there is now a 'cure' for them, you look like a hero and they are loyal to you forever more – a win for everyone!".

Astigmats tend to be over-represented among contact lens drop outs,[4] suggesting that poor vision as a result of uncorrected astigmatism is a contributory factor in contact lens discontinuation.[5-7] Contact lens drop-out remains a major concern for practitioners. Research suggests that the number of lapsed wearers in the UK in 2011 may be as high as 2.4 million, a large number when you consider the number of current contact lens wearers is just over 3.6 million.[8]

Keith Tempany, a contact lens optician from Broadstone, feels successful toric lens fitting is important not only for patient satisfaction but also for the practice. "If you have happy astigmatic patients, then that will help you to achieve a successful practice! Toric lenses have improved greatly in recent years. They are more reproducible than ever before, thinner, more stable and provide better oxygenation to the cornea" he says.

Birmingham-based optometrist Preete Kumar also commented on the large range of toric powers available and the wide choice of lens designs, modalities and materials in the current soft toric portfolio.

Yet, challenges remain in successfully fitting astigmats. A recent study demonstrates that the clinician's assessment of the stability of soft toric lenses in the chair is not well correlated to lens stability in the patient's life beyond the chair.[9] This parallels what another group of authors found when fitting presbyopes. Woods *et al*[10] reported that patients' modality preferences changed depending on what real-world tasks they were engaged in, from using a mobile handheld device to low-light near tasks and night-time driving. They concluded that "making a prediction of success based on consulting room acuity tests alone is probably unwise". If you think about it, this shouldn't be surprising. The consulting room – with its static, high-contrast eye chart viewed in primary gaze – is an extremely artificial setting. Outside the practice, patients are faced with variable lighting conditions, many different degrees of contrast and spatial frequencies, and most importantly, a world in motion.

Figure 1: In the real world, changes in head position may pose challenges for soft toric lens wearers

The eye movements and changes in head position required to interact with that world pose particular challenges for soft toric lens wearers. Depending on the lens design, the effect of gravity, eyelid vectors, and blink forces can cause unpredictable degrees of rotation. For example, when an individual tilts their head, gravity influences the lens differently compared to when the head is in an upright position (Figure 1).

Ballasted lenses that depend primarily on gravity for stability are particularly prone to rotate with head tilt. Studies have shown that all lenses rotate with a change in posture or head tilt. However the amount of rotation between lens designs varies greatly. Prism ballast designs may rotate as much as 30 degrees with a 90 degree head tilt, while lenses with more stability points designed to reduce the effect of gravity (Accelerated Stabilisation design, ASD), rotate just eleven degrees.[11] Stability of toric design rotation also varies with direction of gaze; the average change in orientation varied from three degrees (for ASD) to 9.5 degrees (for some prism ballast designs).[12] While the direction of rotation of the lens varies with the direction of gaze, this is not relevant to the affect on vision.

Large versional eye movements, such as the motion required to glance into a rearview mirror and then quickly back at the road, can also dramatically affect the forces acting on the lens. Again, ASD has been shown to provide greater stability than prism-ballasted lenses do for large versional tasks.[12] When tested for a variety of tasks - settling time, during reading, visual search and for large versional movements - the ASD design was found to be most stable.

Impact of Soft Toric Lens Rotation

The problem with mis-rotation of a soft toric lens is that it causes a transient reduction in visual acuity that patients find bothersome. During normal activities, vision may fluctuate from 6/5 to 6/9 to 6/6 as a toric lens rotates with changes in gaze.

"Variable vision can be an issue" says Cameron. "Most patients get clear vision at some point when wearing toric lenses. The problem is it can disappear with blinking or moving the eyes, causing vision that is variable sometimes and clear at other times." Practitioners might assume that sports or other very active tasks pose the greatest problem for toric lens wearers. However, often visual fluctuations with work activities can pose the greatest problem. "Computer use and activities where lenses can dry out may alter the fitting characteristics and hence the vision in a way that doesn't happen with spherical lenses" said Cameron. Tempany agreed that "everyday activities including sport, screen-use (especially fine detail and spreadsheets) and driving in air-conditioned car can be visually challenging." "Lying on the sofa and less extreme sports such as yoga and pilates can also be an issue with vision when wearing soft torics" added Kumar.

So how can we do a better job of assessing lens stability in the consulting room, before going through multiple pairs of trial lenses? One way is to have patients mimic more natural eye and head movements rather than just looking straight ahead at the Snellen chart. Tempany explains his technique, which includes finding out the activities the patient does and trying to recreate them in the consulting room. "I may ask the patient to look at a computer screen in the consulting room to check their

Figure 2: The Visual Acuity Near Toric (VANT) chart for testing dynamic vision in soft toric contact lens wearers

vision, and also their mobile handheld devices to check vision for SMS and emails. I also like the patient to road test their lenses before assessing the fit, so I routinely send them out for a fifteen minute walk."

Kumar always asks the patient how their vision feels before she checks their vision. "I ask them to grade vision from 1-10. Incorporating a subjective outlook is vital and asking the patient if the letters remain stable as they continue to look at the chart."

Another quick, low-tech test is to present the near acuity chart sideways. Almost universally, people will tilt their head to view something written sideways. Testing acuity in this position is a good indication of how much visual acuity is lost with lens rotation during common actions such as watching TV on the sofa, aligning a golf ball, or a mechanic looking under a car. Soft toric lenses will rotate with this action, but the practitioner should look for lenses that rotate as little as possible, and just as importantly quickly rotate back when the patient returns to primary gaze.

Techniques in Practice

A group of researchers from University of Manchester developed a novel chart for assessing near vision in soft toric contact lens wearers. The Visual Acuity Near Toric (VANT) chart is intended to serve as a practical tool for testing dynamic vision in the office. It consists of a central, colour coded logMAR eye chart and eight peripheral letter targets set on a white background measuring 60cm x 40cm (Figure 2). Looking at the horizontal and diagonal targets from the logMAR central panel creates a versional movement of about 40 degrees, while the vertical targets create versional movements of about 25 degrees. During testing with this chart, it was found that the horizontal and vertical versions cause lesser degrees of lens misalignment than traditionally thought. This may explain why the traditional instructions to "look up, look down, look left, look right" don't necessarily predict success with soft toric lenses. This research indicated that the four diagonal movements (e.g. up and to the right) create the most significant lens rotation. This corresponds well to our patient feedback of difficulty during these types of versional tasks.

In a study that looked at just the diagonal versions, 35 subjects (68 eyes) were fitted with four soft toric lenses in random order.[9] After a settling period of five minutes, standard high- and low-contrast distance logMAR acuity measures were taken, as well as standard lens fit assessments of centration, movement, and corneal coverage using a five-point grading system. Patients were instructed to look at a diagonal target in the corner of the VANT chart, then look back at the eye chart in the centre and read the smallest line they could see clearly. Investigators recorded the rotation (the angle between the vertical lens scribe marking and the 6 o'clock position) and stability (the maximum excursion of the lens in degrees), as well as the near acuity, following these versional movements. All measurements were monocular.

The typical soft toric lens wearer underwent a reduction of about one line in near visual acuity after diagonal eye versions, with some wearers experiencing much larger reductions of up to eight lines of acuity.

This study shows the clear relationship between measures of lens stability and the magnitude of visual acuity loss.[12,9] With this method, lenses with better rotational stability[11] had less visual acuity loss. Indeed, VANT acuity was better in lenses using ASD when compared with two prism-ballast designs.[9]

An Unconventional Approach

The VANT study verified what practicing clinicians have long realised anecdotally, that the conventional static approaches to measuring acuity do not fully replicate the real-world experience of soft toric lens wearers. The large versional movements used in this study may be required in day to day activities such as driving, where movements up to 60 degrees are common, and when viewing a large visual display unit screen, where versions of approximately 40 degrees are frequent.[13] Therefore, in clinical practice, a dynamic assessment of visual acuity using a chart such as the one in this study is likely to be a useful addition to the soft toric assessment. If clinicians take one key point from the study of this novel chart, they can incorporate simple diagonal movements into evaluations of lens rotation and acuity.

Conclusions

The full correction of astigmats with soft toric lenses is still a largely untapped opportunity with practitioner recommendation being a key factor. Many astigmats can be successfully fitted if some simple steps are followed (see Top Tips).

For real world success with soft torics beyond the consulting room, practitioners should assess lens performance during real life activities where eye and head movements cause rotation and instability. Lens rotation should be assessed in oblique positions of gaze. Kumar concludes that "It is important to offer astigmatic patients vision as good their spectacles along with other benefits, such as comfortable wearing time, to suit their lifestyle. This will help to reduce drop-outs, ultimately leading to a more successful practice."

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