# Life in the fast lane

Catharine Chisholm steered the audience through the challenges and opportunities presented by contact lenses and driving in her BCLA Presidential Address in London last month

Contact lenses have many benefits for drivers. They provide visual acuity comparable to spectacles, result in less obstruction to field of view, and are a better option for high myopes and those with corneal irregularity.

As Dr Catharine Chisholm told BCLA members and guests in her Presidential Address, 'Life in the fast lane: contact lenses and driving', contact lens wearers are also seen more regularly in practice. In theory, she argued, they should be wearing a more up to date Rx and therefore see better than spectacle wearers.

But buying lenses over the internet or neglecting to bring their spectacles up to date could leave contact lens wearers below the required standard. Practitioners, too, might compromise vision in favour of cost or convenience, especially when fitting lenses for occasional or sports use. Uncorrected astigmatism was a particular problem, with an average loss of acuity of 1.5 lines per dioptre.

Driving was a very visually demanding task, with a cluttered scene of low to medium contrast. Visual performance was reduced at night and drivers often suffered from glare when the sun was low in the sky or from oncoming headlights.

One of Dr Chisholm's own research interests was investigating eye movements and fixation using driving simulators. Better visual performance led to quicker reaction times and the ability to assimilate information during rapid scans of the visual scene.

Impaired visual performance required the driver to focus for longer on the object of interest, such as an unfamiliar road sign or cyclist, distracting them from other potential hazards within the visual field.

Novice drivers tended to have poor scanning, a smaller functional field of view (the area over which relevant information could be assimilated) and made limited use of peripheral vision so it was especially important for them to have clear vision.

## CLs and eye movements

Spherical contact lenses generally resulted in little or no degradation in visual performance on eye movement since a well fitting lens followed the eye almost exactly. But loose-fitting soft lenses could lead to unstable vision on blinking and slower catch-up following versions. When assessing lens fit, practitioners should consider the degree and speed of horizontal lag, and modify the fit to minimise lag if vision was likely to be impaired.

**Street scene from driving simulator at the University of Leeds, showing infra-red eye-tracking camera**
(Image courtesy of Dr Richard Wilkie)

Toric soft lenses were susceptible to rotation although extreme diagonal gaze was uncommon when driving. Orientation and stability were critical and should be checked in various positions of gaze after settling. Lenses with different methods of stabilisation could be trialled.

With RGP lenses, a loose fit led to unstable vision and good centration was important to minimise the effects of aberration at night. Excessive movement on blinking would cause flare if the limit of the optic zone crossed the pupil at night.

Night driving also raised issues with corneal irregularity and higher-order aberrations. One study showed that orthokeratology reduced contrast sensitivity to the extent that more than one in three drivers failed night vision tests.

The vehicle environment was a further source of potential problems for contact lens wearers from reduced VA caused by tear film changes, dry eye symptoms, increased tear viscosity and lens deposits. The effects of low humidity, temperature changes from heaters and air conditioning, and airflow directed at the windscreen were exacerbated by reduced blink rates. UVA exposure through side windows was also a risk.

Management options included rewetting drops, a mucomimetic on lens insertion, treating even the mildest cases of poor tear film quality and over-spectacles or sunglasses to act as a barrier to airflow. Choose a lens type to minimise dehydration and maximise comfort, said Dr Chisholm.

### RECOMMENDATIONS FOR DRIVING AND CLS

- Most contact lens wearers are drivers – make sure they meet the driving standard with contact lenses and with spectacles
- Advise drivers to keep an up-to-date pair of spectacles in the car
- Ensure good vision, especially for novice drivers
- Correct astigmatism wherever possible and check orientation of torics in different positions of gaze
- Consider checking contrast sensitivity
- Provide over-spectacles for monovision wearers

## Presbyopic drivers

Advantages of presbyopic contact lens correction for driving included the ability to see the dashboard more clearly than with single-vision spectacles or contact lenses, and the absence of distortion on reversing, compared to multifocal spectacles.

But older drivers already had a reduced useful field of view and were also less likely to tolerate any further decrease in contrast sensitivity. Most multifocal contact lenses left astigmatism uncorrected.

Studies of night-time driving performance on closed-road driving circuits showed that multifocal contact lenses resulted in shorter legibility distance for street signs, longer fixation times and slower driving speeds than single-vision or progressive addition spectacles.

Monovision correction might cause no impairment in daylight conditions, other than when reversing, but studies had shown that night-time driving was affected.

Dr Chisholm's advice for managing presbyopes was to check contrast sensitivity before fitting contact lenses and be wary of fitting vocational night drivers or those with >0.75D of astigmatism. Counsel drivers on what to expect of their presbyopic correction and allow an adaptation period before driving at night.