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Cataract and driving

Onset of cataract and its surgery have both practical and legal consequence for driving. In the UK the need to satisfy the number plate test is absolute in law (a standard number plate of 79.4 mm in height at 20.5 metres in good daylight). Empirically found to be equivalent to 6/10 Snellen,¹ the test is consistent with the European Union (EU) Directive (now law),² which requires a minimum acuity of 0.6 metric (= 6/10 Snellen), as well as a minimum field of vision of 120°.

The paper in this issue of the *BJO* by Mönestam and Wachtmeister (p 16), states a legal requirement for Sweden as 0.5 (6/12 Snellen) at the time of the study, though Sweden is now subject to the EU directive (and 0.6 acuity). This variation does not detract from the value of their paper which investigates driver patients' largely subjective estimation of their visual function while driving, as well as their actual visual acuities both before and after modern cataract surgery. It is to some extent a measure of their driver patients' needs from cataract surgery as well as their expectations. The latter are sometimes unrealistically high in UK experience. Their results show a commendably high standard of visual improvement for driving. In the light of driving safety the authors show the real value of pseudophakic cataract surgery, as well as the value of surgery for the second eye. They look specifically at the problems of estimating distance, which is of some importance in driving and is relevant to other research—for example, into 'estimated time to collision', and other psychophysical factors.³

Interestingly, their paper records 23% of patients before surgery who continued driving while below the national standard, a not unknown clinical finding in the UK. They

find little correlation between visual acuity and difficulty in driving before surgery; perhaps a reflection of the weak statistical correlation of the multifactorial visual factors to driving accidents.^{4,5}

The authors reasonably rely on much very subjective data, bearing in mind the subjective nature of visual perception itself. Perception is at least as important as vision in driving. New studies and methods to test drivers' visual perception are beginning to emerge—for instance, 'usable field of view' and driving simulation.^{6,7}

There are, of course, other factors to be addressed in the context of cataract surgery and driving—that is, the role of contrast, and also discomfort and disability glare in both bright daylight and from oncoming headlights.^{8,9} Glare in some of these circumstances can produce both optical flare (and disability glare) as well as diffraction effects from headlamps and street lamps, both before and after surgery. Brightness acuity and glare tests have been used to assess both discomfort and visual function for driving in glare conditions.^{10,11}

Personal investigation has shown glare and diffraction effects can be quite serious in early cortical and, especially, cuneiform cataracts. These indicate the value of the number plate test as a practical visual acuity and square wave contrast sensitivity test in the real highway environment.⁸ The same investigations have shown that diffraction lines occur with bright sources such as headlamps, street lighting, and surface water reflections. These are also significant after extracapsular surgery where there are capsule traction lines present. The angle of the diffracted flare line can be directly related to the traction line axis. Capsule pearls can produce a more diffuse flare and disability

glare.¹² These phenomena can reduce driver patients' subjective satisfaction after pseudophakic surgery. Even after effective YAG laser capsulotomy diffractive phenomena can still occur with pupil dilatation in dark conditions, especially where the capsulotomy has been made small for quite valid reasons. 'In the bag' implantation and continuous curvilinear capsulotomy within the normal pupil margin to some extent increase the possibility of these diffractive phenomena.

There are other factors which may reduce patient satisfaction with their cataract surgery, in particular altered visual space as a result of changed refractive error and, rarely, anisometropia. The latter is less common since the use of A scan biometry has become almost universal, though errors still occur. Equally, changed or added astigmatism, fairly common in extracapsular surgery, can alter perception of visual space and driving coordination. Newer small incision techniques, such as phacoemulsification, barely alter or even reduce astigmatism, and have gone a long way to overcome these sources of dissatisfaction.¹³ These postoperative alterations make it prudent that there should be a period of adaptation before driving after cataract surgery, even where the legal standards can be met. This period might be as short as a week with current surgical methods.

There are still some patients driving with aphakia (especially in the developing countries) though the problems of magnification, astigmatism, spherical and chromatic aberration, and the roving ring scotoma of non-aspheric aphakic glasses are true handicaps for driving. Some of these drivers barely reach or fail the visual field standard² and there is a natural reluctance of many ophthalmologists to jeopardise their patients' right to drive by too rigorous investigation.

The paper from Sweden shows that a few driver patients decide not to resume driving after surgery, but most improve greatly from modern extracapsular cataract extraction or phacoemulsification cataract surgery and appreciate the benefit of retaining that important civil liberty, the right to drive.

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