

Contemporary Case Histories

A Series for Optometry Today

This series aims to demonstrate the scope of modern optometric practice in the UK today. Each case will illustrate a particular facet of modern practice, be it contact lenses, pathology, binocular vision or low vision. The authors are practitioners, Dr Trusit Dave, PhD, MCOptom, FAAO, David Ruston, BSc(Hons), FCOptom, DCLP, FAAO, and Frank Eperjesi, BSc(Hons), MCOptom.

CLINICAL CASE NUMBER 1

Practitioner: David M. Ruston, BSc, FCOptom, DCLP, FAAO

SUMMARY

A 41 year old consultant anaesthetist had for many years accepted poor vision and asthenopia with her rigid gas permeable contact lenses. The visual acuities were 6/9 right and left, and improved to 6/5 with cylindrical over-refraction. She was re-fitted with RGP front surface toric lenses using prism ballast and truncation to stabilise the cylinders. These were fitted without using trial lenses incorporating a prism and when the first pair of lenses were issued, it was noted that the right displayed more than the estimated 5° of nasal rotation. It was, therefore, re-ordered taking this into account, and final visual acuities were 6/5 right and left. The patient wears the lenses all waking hours with no signs of insult to the corneal physiology and full resolution of the visual problems.



Figure 1: Existing right lens showing alignment and excessive edge clearance; some peripheral stain can be seen at 3 o'clock

PATIENT DETAILS

Name: Dr T.G.
DOB: 03/10/54
Occupation: Consultant anaesthetist
Driver
Date of examination: 16/04/96
New patient
Race: Caucasian

SYMPTOMS & HISTORY

The patient reported that her eyes had seemed "out of balance" when wearing CLs for several years, particularly when reading or giving injections. Her left eye seemed less clear for distance vision for the last three months. She suffered with frontal headache with prolonged reading for the last year.

Lenses were comfortable, worn all waking hours. They had been worn for 10 hours at the check-up. She used Boston cleaning and soaking solutions.

Current Spectacles Rx: (? 1988)

R: -2.75/-2.25 x 65 = 6/6
 L: -3.75/-2.00 x 150 = 6/6-

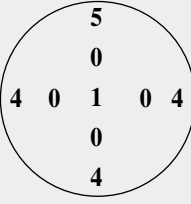
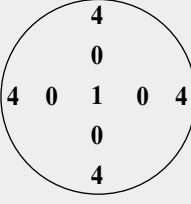
GENERAL HEALTH

There was no history of any systemic disorder and no current medication. No family history of diabetes, hypertension or ocular disease. There are no current or previous allergies.

PREVIOUS OCULAR HISTORY

The patient was fitted with PMMA in 1976 and then re-fitted with RGPs 1986. No history of infections or other ocular disease.

Table 1: Assessment of fit

Right	Feature	Left
Good Rather large 1.5mm	Centration	Good
	Size	Rather large
	Movement	1.5mm
	Fluorescein Pattern	
	(grade 0-5 describes clearance from cornea, negative sign implies bearing)	
Too large, but aligned fit Excessive edge clearance	Assessment	Too large, but aligned Excessive edge clearance

She was told that her vision could not be improved at her last check two years ago with another practitioner.

EXAMINATION

VA c Cls: R: 6/9
L: 6/9

Over-Rx: R: +0.75/-1.25 x 55 = 6/5
L: Plano/-0.75 x 115 = 6/5-1

CT: 6m: 2Δ XOP
1/3m: 5Δ XOP (rapid recovery)

Ocular motility: Full

NPC: to nose

Amp. Accom: R 5.00D, L5.00D
Binocularity: 5 mins of arc (Mallett unit)

Pupils: Brisk to light and accommodation
Equal size

Confrontation: Full fields right and left

Assessment of Fit: (see Table 1)

Keratometry:

R: 7.40 along 29 7.19 along 119
L: 7.38 along 165 7.11 along 75

Tonometry: (Non-contact tonometer at 5pm)
R: 12 14 14
L: 13 12 12

External Eye & Media: (see Table 2)

Fundi

Both optic discs were healthy, cupping 0.20 in both eyes. The disc margins in both eyes were flat and distinct, neuroretinal rims were also found to be healthy (pink in colour, no asymmetry). The A/V ratio was 2:3 in both eyes and the maculae were normal in appearance with obvious reflexes.

C L specification:

R: 7.45:7.50/9.50 -4.25 Blue one dot
L: 7.40:7.50/9.50 -3.75 Blue

Refraction:

R: -3.00/-1.75 x 55 = 6/5
L: -3.75/-2.25 x 135=6/5
No addition necessary.
Reads N5 at 40cm

Visual fields:

R&L: Humphrey Mk 2 40 point screen; all points seen. Test done without lenses.

ACTION & ADVICE

The patient was advised that her asthenopic symptoms, headache and poor vision were

attributable to residual astigmatism. The possible options are - over-spectacles and spherical RGP CLs, front surface toric RGP lenses or soft toric CLs. In view of her excellent tolerance to RGP lenses, and high probability of success, it was decided to refit with RGP front surface toric CLs. The patient was warned that the result was not always perfect first time.

DETAILS OF RE-FIT

Inserted trial lenses:

R: 7.40:7.50/9.20 -3.00
L: 7.40:7.50/9.20 -3.00

Over-refraction:

R: Plano/-1.25 x 55 = 6/5
L: -0.50/-1.00 x 135 = 6/5

Assessment of Fit: (see Table 3)

Order:

R: C3 7.40:7.50/8.05:8.30/9.35:9.20
Trunc 0.40 along 180 -3.00/-1.25 x 50
L: C3 As right
Trunc 0.40 along 180 -3.50/-1.00 x 140
Prism ballast 1½Δ base down

DKF60 blue tint.

Lenses posted to Pt. All parameters checked before posting. Base curves measured 7.38 R&L (within tolerance) otherwise all fine. Appointment made for 2/52 after receipt.

FIRST AFTERCARE APPOINTMENT (29/04/96)

SYMPTOMS

The patient reported that she finds her vision much better, although ? vision in the right worse than left. She is now free of eyestrain and headaches. No dryness, misting, redness or stickiness have been experienced. She was wearing all waking hours (16 hours) and today, 8 hrs. Solutions used were Boston cleaner and Boston wetting/soaking.

EXAMINATION

VA c Cls: R: 6/7.5
L: 6/5

Over-Rx: R: +0.25/-0.75 x 25 = 6/5
L: Plano
Reads N5 at 35cms.

Table 2: External Eye & Media

Right eye	Lens condition	Left eye
Minor scratches		Minor scratches, several non-wetting areas
Healthy, clear lid margins	Lids, lashes	Healthy, clear lid margins
No chemosis, no hyperaemia	Conjunctiva	No chemosis, no hyperaemia
Nil, clear reflex mild 3&9 (grade 2) None	Cornea: oedema stain opacities	Nil, clear reflex mild 3&9 (grade 2) None
Healthy, looped blood vessels	Limbus	Healthy, looped blood vessels
Clear, anterior chamber quiet	Media and lens	Clear, anterior chamber quiet

Table 3: Assessment of Fit

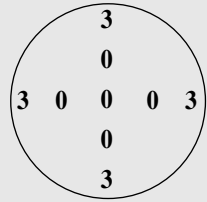
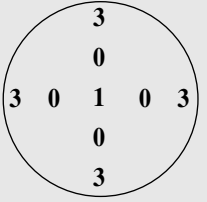
Right	Feature	Left
Good Optimal 2mm	Centration Size Movement	Good Optimal 2mm
	Fluorescein Pattern (grade 0-5 describes clearance from cornea, negative sign implies bearing)	
Classic alignment fit	Assessment	Classic alignment fit



Figure 2: The toric lens for the right eye showing nasal rotation of approximately 15°

SECOND AFTERCARE APPOINTMENT (07/05/96)

SYMPTOMS

Dr T.G. stated that her vision was much better in both eyes. She was free of all eyestrain and headaches. No dryness, misting, redness or stickiness experienced. Lenses were worn for eight hours before the examination.

EXAMINATION

VA c CLs: R: 6/5
L: 6/5
Over-Rx: R: Plano
L: Plano
Reads N5 at 35cms.

Assessment of Fit:

As 29/04/96 (see Table 4)

External Eye & Media:

As 29/04/96 (see Table 5)

ACTION & ADVICE

Patient was advised right lens was now satisfactory. In view of very good tolerance and totally normal appearance to cornea, review scheduled for one year.

DISCUSSION

This patient had been told several times in the past by her previous practitioner that there was no means of improving her vision further. This was not true. Even if toric lenses were not available, she could have been helped by auxiliary spectacles for concentrated vision. However, both toric soft and toric hard lenses are available, with improved reproducibility^{1,2}. Given her long-term wear and success with rigid lenses, I saw no reason to re-fit her with toric soft lenses which have lower oxygen transmissibility than RGP lenses^{3,4} and a higher potential for infection and complications⁵. In the majority of cases, toric back surface or bi-toric lenses are used to improve the physical fitting and visual result on astigmatic eyes.^{6,7} In this case, there was only 0.20mm (1D) of corneal astigmatism in the right eye and 0.27mm (1.25D) in the left; a toric back surface was not appropriate to correct the refractive astigmatism. The rear of the lens should be spherical for optimum fitting and the front toroidal to correct the residual cylinder. To stabilise the lens, a prism ballast is required, with the option of also incorporating a truncation.

There are three methods of fitting this type of contact lens⁸:

1. Use of a prism ballasted trial set.

Assessment of Fit: (see Table 4)

External Eye & Media: (see Table 5)

ACTION & ADVICE

It was explained that the right lens was rotating nasally more than expected. A new right lens was ordered with a compensation

for this rotation.

Right re-ordered as:

R: C3 7.40:7.50/8.05:8.30/9.35:9.20
Trunc 0.40 along 180 -3.00/-1.25 x 35
Prism ballast 1½Δ base down
DKF60 blue tint.

Lens posted to Pt. All parameters checked before posting. All satisfactory.

Table 4: Assessment of Fit

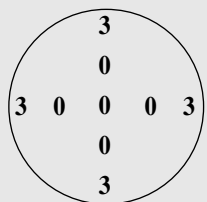
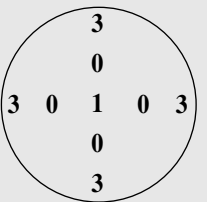
Right	Feature	Left
Good Optimal 1.5mm	Centration	Good
	Size	Optimal
	Movement	1.5mm
	Fluorescein Pattern	
	(grade 0-5 describes clearance from cornea, negative sign implies bearing)	
15° nasal	Truncation location	5° nasal
Classic alignment fit	Assessment	Classic alignment fit

Table 5: External Eye & Media

Right eye		Left eye
Clean, scratch free and wetting well	Lens condition	Clean, scratch free and wetting well
Healthy, clear lid margins	Lids, lashes	Healthy, clear lid margins
No chemosis, no hyperaemia	Conjunctiva	No chemosis, no hyperaemia
Nil, clear reflex trace 3&9 (grade 1) None	Cornea: oedema stain opacities	Nil, clear reflex trace 3&9 (grade 1) None
Healthy, looped blood vessels	Limbus	Healthy, looped blood vessels
Clear, anterior chamber quiet	Media and lens	Clear, anterior chamber quiet

Table 6: Guide to amount of prism required to stabilise a front surface toric RGP lens

Contact Lens Power	Prism Ballast Power	Contact Lens Power	Prism Ballast Power
Plano	1.25	Plano	1.00
-1.00	1.25	+1.00	1.00
-2.00	1.25	+2.00	1.00
-3.00	1.50	+3.00	1.25
-4.00	1.50	+4.00	1.25
>-4.00	1.50 - 1.75	>+4.00	1.25 - 1.50

2. Using conventional non-prism, ballasted trial lenses to order a spherical front surface lens with prism ballast, with the base of the prism marked by a dot. This is then observed in the eye and the predominant inclination of the prism base measured.

This can be done by:

- (i) Fitting a trial frame onto the patient and placing a trial lens in it with an obvious straight line marked on it. This is then rotated so that the line passes through the dot and the centre of the lens, not the centre of the cornea;
- (ii) Rotating the slit beam so that it passes through the aforementioned points and reading off the angle from the scale; or
- (iii) Photographing the lens in its habitual position. Once the rotation of the lens is known, the cylinder is then worked on the front taking this rotation into account.

3. Making an estimate of the likely rotation by examining the angle of the lower lid to the cornea at its centre and ordering a lens with prism ballast and the front surface cylinder with its axis modified to reflect this angle. The prism base can be marked if necessary, enabling the practitioner to assess the accuracy of his estimate and order a further lens if necessary. This is the method I employed.^{6,7}

Method (1) is arguably the most accurate, since the prism ballast is present in the trial lens and, therefore, this is more like the final lens than a spherical trial lens. However, the addition of the front surface cylinder when the final lens is ordered can affect the final lens riding position.⁹ However, this type of lens is only required for a relatively small percentage of patients⁷, and it is comparatively rare for a practitioner to use such a set.

Method (2) is more time consuming, which is why I do not employ it in my practice, where patients are unable to make frequent visits, and it has the additional disadvantage of requiring the front surface cylinder to be added by hand polishing with the attendant problems of reduced wetting with RGP materials³, and the fact that the

removal of material can affect the lens riding position.

I used method (3) and, in this case, I estimated that the lenses would rotate 5° nasally, and ordered the cylinder axes taking this into account. It is difficult to predict the final position of the prism base and the effect of the nasal rise of the lower lid. This latter factor has been estimated at 10-15°¹⁰, whilst the former has been quoted as being 20° nasally¹¹ and 10° nasally¹². I followed the fitting procedure set out in standard texts^{6,7,9,13}. In view of the mild degree of 3 and 9 o'clock staining which she had and my feeling that the existing lenses were rather large, I used smaller diameter lenses when ordering the torics with less edge clearance. This can be effective in reducing 3 and 9 o'clock stain¹⁴. The amount of prism was determined by reference to Table 6 (see above).

Once I had ascertained that the ordered lens rotated 15° nasally, producing a induced cylinder, I re-ordered the lens with a re-adjusted cylinder axis. Naturally, the same effect could have been produced by a lens which was incorrectly manufactured, having the incorrect cylinder axis or a prism base displaced temporally. Therefore, I verified that this was not the case before ordering the new lens. It is a common fault for a laboratory to incorrectly mark the prism base¹³.

A further problem with this type of lens is that the lens can rotate further on downgaze for reading. In this case, this did not occur (verified by checking the dot position on the Burton lamp in downgaze), but if it does, then a compromise has to be made between optimum distance and near vision. For some patients, a front surface toric lens with prism ballast can be less comfortable than an equivalent spherical lens and, in these cases, the technique of double truncation can be used¹⁰. I ordered a single truncation for this patient, who had good tolerance, in the hope that it would improve stability. It also makes assessing the angle of rotation easier. If necessary, further truncation can always be added later as an in-practice modification⁸.

My normal first choice RGP lens for

patients is a multi-aspheric high Dk design¹⁵. However, our laboratory is unable to work a front surface toric lens with an aspheric back surface for technical reasons, and so I employed a tri-curve design. The toric surface is produced by the technique of crimping^{6,7}, rather than hand polishing, as we find this prevents the wetting anomalies associated with the latter, related to excessive heat generation during polishing.

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