Successfully fitting the patient with rigid gas permeable (RGP) contact lenses does not signify the end of the patient journey – contact lens aftercare should be regarded as a continually evolving management plan which is a ‘joint venture’ between both the practitioner and patient which needs to be reassessed on a regular basis. Patients need to understand that these routine appointments are best practice to ensure the wellbeing of their continued ocular health. This final article in a four-part series looks at the aftercare routine, discusses patient compliance and the management of some common complications associated with RGP lens wear.

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Learning objectives
Be able to recall the elements of a comprehensive rigid gas permeable (RGP) contact lens aftercare regimen, consider patient compliance, and manage common complications associated with RGP lens wear (Group 5.2.2)

About the author
Mark Tomlinson has been in optics for 34 years as a dispensing optician, contact lens optician and optometrist. He currently works as a part-time optometrist and is a practice academy consultant for Alcon, where he lectures on various CET topics, including contact lenses. He has previously lectured widely to optometric audiences, including pre-registration students and peers on a local level.
Patients generally only retain about 30% of what they hear in a clinical environment, so for contact lens patients the early aftercare appointments have to be regarded as an extension of the fitting procedure, particularly as it gives the practitioner an opportunity to check the patient’s compliance and understanding of the care routine required with their new lenses. Similarly, experienced patients may slip into bad habits which are always better addressed early to avoid the lens performance deteriorating, which may lead to patient dissatisfaction, reduced motivation and ultimately cessation of lens wear.

Contact lens materials and lenses care systems are continually evolving. Consequently, the aftercare consultation is an ideal opportunity to discuss the benefits of better products. This proactive approach should be regarded as best practice in fulfilling the duty of care to the patient.

Communication skills, as well as clinical judgement, are required to provide a comprehensive aftercare, which will require analysis of the patient’s symptoms along with clinical signs, culminating in an explanation of the management strategy to the patient in an approach which will both engage and enlighten them.

**Aftercare routine**

The first aftercare appointment should ideally be made one to two weeks after the initial fitting. If this appointment is too soon, then the practitioner may simply be analysing subjective issues of an adaptive nature. Conversely, if the consultation is left too long, then clinical issues may have already manifested, or the patient may have already decided to stop wearing their new lenses. Practitioners should, therefore, develop a systematic approach to the aftercare routine, which should include appropriate questioning, objective and subjective assessments of the lens. All visits need to be recorded accurately as determined by the GOC. (Guidelines are available from the College of Optometrists and ABDO.)

**Initial discussion**

The first question which needs to be established is the purpose of the aftercare: is it routine, or are there any issues which need to be addressed? If there are any problems, then questions starting with ‘Which’, ‘What’, ‘Where’ are necessary to establish the symptoms. It is likely that any concerns are likely to involve comfort, vision or cosmetic appearance, and this may have prevented the patient wearing their lenses for the appointment. Subsequent questions need to establish the patient’s frame of mind towards their lenses:

- Has satisfactory progress been made?
- Neophytes need monitoring more closely in the first few weeks; disillusioned patients are more likely to drop out of contact lens wear.
- What is their wearing schedule – that is, hours per day, and days per week? Is the patient happy with this routine?
- Are there any handling issues?
- Are the solutions working satisfactorily, and is the patient using them correctly?
- The technique of eliciting information from patients should centre on asking ‘open’ rather than ‘closed’ questions, which should promote a free-flowing discussion rather than a disjointed monologue of ‘yes’ or ‘no’ answers.

**Visual acuity**

Monocular VA needs to be recorded, along with binocular vision for distance and near. If any over-refraction is required, start with a straightforward spherical correction to increase the acuity to an acceptable standard. If this is unsatisfactory, a sphero-cylindrical refraction may be required. Retinoscopy and pinhole are also useful techniques to use in order to determine any residual refractive error.

**Fitting assessment of the lenses in situ**

**White light**

Slit lamp examination using white light with low magnification and diffuse light should be performed. Assessing, lens centration and corneal coverage, movement on blinking, completeness of blink, and any anomalies such as air bubbles and debris trapped under the lens should be noted. An observation can also be made of the adnexa of the eye. The slit lamp beam can then be changed to an angled focal light with a 2mm beam in order to observe the condition of the lens surface and check for any edge damage. Surface deposits and ‘on eye’ wettability can be assessed. Lens deposits are generally easier to observe when the tear film is drying (protein has a dull appearance, whereas lipid deposits appear shinier).

**Fluorescein assessment with cobalt blue filter**

Fluorescein should be instilled, with an analysis of both dynamic and static lens fit. The static fit indicates how the back surface of the lens aligns to the cornea, while the dynamic fit assesses how the lens centres and moves on the eye. Observations will include:

- Central fit and alignment – the practitioner should assess if the tear film is uniform in appearance over the optic zone, or if there is apical touch/excessive pooling
- Peripheral fitting and edge clearance – a good peripheral clearance shows a band of fluorescein approximately 0.5 to 0.7mm wide under the lens
- The rate at which the fluorescein mixes with the tear film under the lens often gives a good indication to the tear flow
- Any areas of corneal or conjunctival staining will become apparent during this procedure, and will need to be verified without the lens in situ.

**Examination with the lens removed**

Ask the patient to remove their lenses and put them into their case. The practitioner should then observe how this task is carried out, as it will give an indication of patient compliance or an understanding of the instructions which were given to them during the insertion and removal training. Particular note should be made of whether the patient washed their hands, and the technique employed to remove the lenses. The eyes should then be examined for any ocular changes induced from wearing the contact lenses.
Retinoscopy
The quality of the reflex may give an indication of surface changes to the cornea.

Analysis of clinical indications
The next step for the practitioner is to analyse all the clinical data, along with the signs and symptoms, and decide whether any alteration is required to the lenses or care scheme.

Typical decisions to consider would include:
- Changing the power of the contact lens
- Altering the fit of the lens
- Changing the care regimen
- Arranging for the patient to be given further instruction on the care and maintenance of the lenses
- Refitting the patient with a different type of contact lens
- Advising the patient to suspend contact lens wear for a period of time.

Explanation to the patient
The conclusion of the aftercare should always be a discussion with the patient. The purpose of this will be to:
- Inform the patient of the results of the aftercare examination;
- Offer reassurance for any subjective symptoms reported at the start of the consultation;
- Discuss any changes which are being made to either the lenses, or care regimen (this should always be justified with the clinical reasoning);
- Offer professional recommendations.

Key questions should include:
- Adequate cleaning – check the patient’s understanding of the correct cleaning procedure, bearing in mind it may be beneficial to switch non-compliant patients to a ‘combined system’ if using two or three separate solutions is causing confusion. The use of tap water should also be warned against;
- Wearing times – if the aftercare appointment is immediately after the patient has started wearing their lenses, manage ‘overtly keen’ expectations using a ‘slowly-but-surely’ approach. Conversely,

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Keratometry
Check the corneal curvature for signs of steepening or flattening, although it is not thought to be clinically significant unless of a sizeable amount. Distortion of the mires is more noteworthy with RGP lens wearers, as this suggests an alteration to the corneal epithelium, which is likely to induce refractive changes, often referred to as spectacle blur.

Reinforcing compliance
When patients stop wearing lenses, it is often during the first few months of wear. Practitioners should ensure that patients fully understand the technique and advice given to them during the training session of application and removal (see Figure 1).

This regimen should be followed up and reinforced during the aftercare consultations, and patients should be asked specific questions exploring their understanding, which will help confirm if they are compliant with the original instruction.

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Management of complications

3 and 9 o’clock staining

3 and 9 o’clock staining is caused by tear film breakdown and drying in the nasal, and temporal, region of the cornea. It has been suggested that some 80% of RGP wearers have some degree of 3 and 9 o’clock staining, but only 10-15% is thought to be clinically significant and is usually asymptomatic (see Figure 2). There are several possible causes:

- Incomplete blinking
- Poor tear film
- Lens diameter may be too small/too large

Periphery of the lens is too flat/too steep
- Centration of the lens is inadequate
- Lens material has poor wetting properties
- Fitting a spherical lens on a cornea which has astigmatism >2.00DC.

Management would be to identify the exact cause, then aim to:

- Improve the centration of the lens
- Change the total diameter of the lens
- Refit with a lid attachment design
- Choose a different lens periphery
- Choose a lens with better wetting properties
- Refit with a toric RGP
- Possibly consider refitting with soft silicone hydrogel contact lens.

Dimple veiling

Dimple veiling is mechanically induced by a poor fitting lens, allowing bubbles to form at the lens edge (known as ‘fothing’), which get sucked under the lens and land under the base curve. These small bubbles are mechanically compressed by the lens and indent the corneal epithelium, which appear very prominent when viewed with the slit lamp after installation of fluorescein. They are usually asymptomatic, unless the dimpling is central, where visual disturbance may be reported (see Figure 3).

The principal causes of dimple veiling include:

- Steep fitting lens, causing central dimpling
- Peripherally dimpling, due to excessive edge lift
- High amounts of corneal astigmatism.

Management will involve refitting the patient with a lens which is more closely aligned to the contour of the cornea.

Corneal moulding

Long-term RGP contact lens wear can alter corneal physiology and corneal topography, which may cause transient but substantial refractive error changes (that is, spectacle blur). Frequently, with corneal moulding or warpage, the only subjective complaint is that of spectacle blur, where the vision with spectacles is worse after removing the contact lens. In basic terms, corneal moulding occurs when the lens-cornea relationship is not adequate, caused by a poor fitting lens. It is also more common when a low Dk material is chosen. Keratometry and/or topography are the most important tests for diagnosing corneal warpage (see Figure 4).

Corneal rehabilitation involves the discontinuation of wearing the habitual contact lenses until the topographical and refractive error changes stabilise. An alternative form of refractive error correction that does not induce further unwanted tissue compression or redistribution is required. This can pose a significant challenge due to the fact that both the spherical and astigmatic refractive error may change substantially over a short period of time.

Lens binding

RGP lens binding or ‘sticking’ is associated with a lens which is not centred on the cornea, typically trapping mucus under the lens, which creates a suction effect, yet generally asymptomatic for both vision and comfort. The most common complaint described by patients is that the lens is more difficult than usual to remove from the eye. The lens is usually decentered laterally or downwards, and while this phenomenon is often associated with overnight lens wear, it may occasionally present in daily-wear patients, particularly towards the end of the day. The practitioner will notice an indentation on the cornea, left by the ‘imprint’ of the edge of the lens. Superficial punctate keratitis may also be present in the surrounding area (see Figure 5).

The causes of lens binding include:

- Lens material – more common in modern lenses with greater flexibility, this was rarely reported with the original PMMA
- Dry eyes
- A lens periphery which is too narrow
- A total diameter which is too large
- Lenses which need to be replaced.

Management options are:
Abrasions and foreign body tracking

Corneal abrasions occur because of a disruption in the integrity of the corneal epithelium, involving either superficial cells or the full epithelial section. The corneal surface is scraped away or denuded as a result of physical external forces, such as contact lenses, foreign bodies, fingernails or an incorrect insertion or removal technique. Contact lens related abrasions are defects in the corneal epithelium which are left behind after the removal of an over-worn, improperly fitting, or inadequately cleaned contact lens. In these cases, the mechanical insult is not from external trauma, but rather from a foreign body which is associated with specific pathogens. The diagnosis of corneal abrasion can be confirmed with slit-lamp examination and fluorescein instillation (see Figure 6). Patient symptoms will depend on the depth of the abrasion, with deeper abrasions causing discomfort, pain or photophobia.

The patient is managed by identifying the cause, and removing it. Lens wear will have to cease for a period of at least 24 hours and, in more severe cases, for one week.

A foreign body trapped under a contact lens will cause an epithelial abrasion, characterised by the 'tracking pattern' produced by the normal lens movement, which can be seen with a slit-lamp and installation of fluorescein (see Figure 7). This abrasion is usually superficial, although the patient may often be in discomfort. The lens should be removed along with the foreign body, and not worn again until the next day. This is seen more frequently in rigid lens wearers, so appropriate advice should be given to RGP patients about using eye protection in dusty or windy environments.

Solution reactions

Solution reactions occur where there is bilateral localised disruption of the epithelial surface. The effects of such reactions are generally related to the dosage of chemical preservative. Patient symptoms include discomfort, increased lens awareness, itchiness, burning and dryness. Clinical signs include hyperaemia of the palpebral and bulbar conjunctiva (see Figure 8) and superficial punctate keratitis (SPK) diffused over a substantial area of the cornea. Infiltrates and an unstable tear film may also be seen, particularly if the reaction is more severe.

Non-tolerance of solutions will generally be more acute directly after the lenses have been applied to the eye, and will subside after the tearing reflex has diluted the effect. Intolerance to RGP solutions is now less common than in the past due to considerable improvements in the formulation.

Management will depend on the severity, with cessation of lens wear in the more severe cases until symptoms subside. Practitioners will have to establish that the patient is following the cleaning procedure correctly, and clarify any areas of confusion. Changing the care regime will, in all likelihood, have to be implemented, avoiding the 'triggering' agents involved.