



Basic contact lens course

Part 10 - Collection and lens care

Andy Franklin and **Ngaire Franklin** describe the best procedure for advising and managing the patient who is collecting their lenses. **Module C14820**, one general point for optometrists and dispensing opticians, one specialist point for CLOs



The advice given at the collection (or 'teach') appointment is an important factor in the success or failure of any contact lens wear. Collection is often delegated to unqualified staff, but it remains the responsibility of the prescribing practitioner to ensure that the advice given is sound, and safe.

During this appointment the patient must be educated in the following areas:

- The importance of hygiene
- Safe application and removal of their lenses
- Adaptation schedule
- How to recognise when things are going wrong
- The importance of regular aftercare and the probable consequences of non-compliance
- Correct use of their care regime.

Hygiene

Fingers that apply contact lenses need to have short, clean fingernails to minimise the risk to the cornea. Patients with long nails should be advised to cut them short, and the time to do this is before the lenses are fitted. Careful hand-washing is essential before handling lenses, and the practitioner should set a good example during the initial fitting process, and check during aftercare appointments that the patient has not forgotten this important step.

Application and removal of lenses

In order to apply a contact lens, the patient must override their own ocular defence mechanisms, and some find this easier than others. In general, females find this a little easier, provided that they have experience in applying eye make-up, but there are exceptions. Many practitioners now agree that it is much better to refer to applying



Figure 1
Lens edges should be inspected

the lens rather than inserting, the former suggesting laying onto the eye, the latter sticking something into the eye! In some cases, a dry run, without lenses, may help to overcome any squeamishness.

The lens should always be inspected before application to ensure that it has no damage or debris attached (Figure 1). We also need to ensure that the lens isn't inside out. There are a number of methods to ensure this:

- Some manufacturers put small markers on their lenses. These consist of patterns or sequences of letters that will only give the correct appearance when the lens is the right way round
- The lens is placed on the tip of a finger and observed from the side. If it is the correct way round, it will adopt a hemispherical 'bowl' shape (Figure 2). If inverted, the edges of the lens will flare out (Figure 3)
- The lens is allowed to dry slightly, then squeezed gently between finger and thumb, as if to fold it in half. If the

lens is the right way round, the edges will turn inwards. An inverted lens will resist the folding, and the edges will attempt to fold back on the fingers

● If still not sure, apply the lens. If it is the wrong way round it will be a little uncomfortable, the vision will be variable, and the lens will move excessively, rather like a loose fit. Even after application, it may be difficult to tell with some lenses. A patient of mine established some sort of record by never arriving for aftercare with either lens the right way round. It never seemed to cause any problems though.

The main challenge when applying a soft lens is the size of the lens relative to the palpebral aperture. RGP lenses are generally less than a centimetre in diameter, but soft lenses are half as big again, and somewhat floppy to boot. It is essential therefore that the patient controls their eyelid and head position throughout the application process, and looking at their own eye in a conveniently placed mirror will help

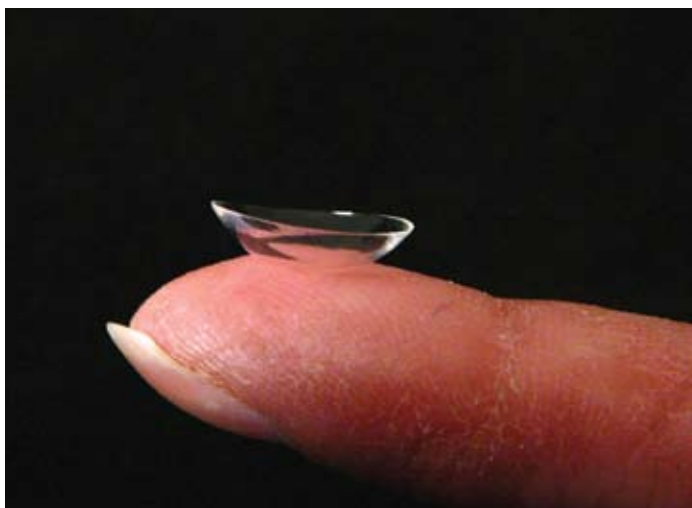


Figure 2 Lens right way round

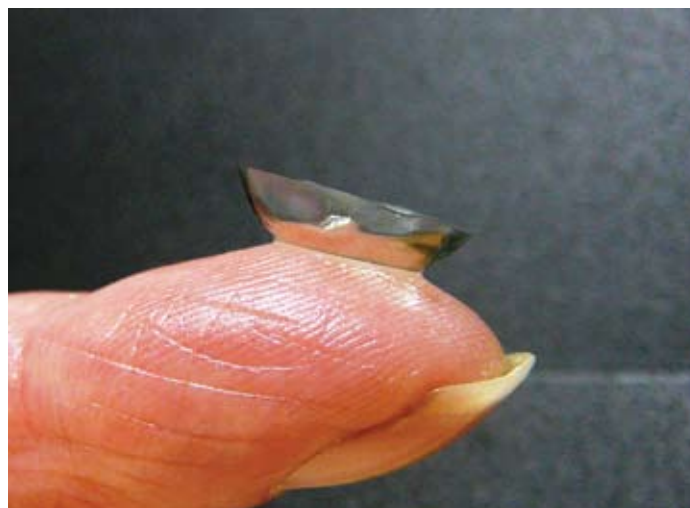


Figure 3 Lens inside out

considerably, at least at first. To apply the right lens, the lens is placed on the tip of either the first or middle finger of the right hand (to apply the right lens), depending on patient preference. It helps if the applying fingertip is as dry as possible before placing the lens ('dry finger, wet lens') and dabbing it on a lint-free tissue before picking up the lens may help the lens to transfer to the eye.

The patient is instructed to look down. The left hand is brought to rest on the forehead and the tip of the middle finger is placed on the upper lid margin of the right eye inside the lashes. The lid is pulled up, and provided the placement of the finger is correct, the patient should be unable to blink with the finger in place. The patient is then instructed to look into the mirror. The lower lid is gently pulled down by the tip of either the middle or ring finger of the right hand, depending which feels more comfortable to the patient. The lens is then applied to the cornea, with the patient encouraged to maintain fixation on their eye in the mirror, so as to counteract Bell's phenomenon. Alternatively the lens may be applied to the upper or lower sclera. To target the lower sclera the patient lowers their chin and looks upwards. This has the advantage that it is a little less likely to trap debris under the optic zone. Once the lens is on the sclera a few good blinks should centre it on the cornea, but if this is not the case the lens can be slid into place with a finger or using the lower lid. Once the lens is thought to be on the cornea the patient should check that they can see with the lens.

New wearers tend to approach the eye with the lens at a snail's pace, which gives them far more opportunity to lose their nerve, and the lens more scope to dry. They also have a tendency to let

go of the lids and look away from the mirror at the moment of application. Gentle coaching is required to overcome this, and patience is required.

Removal of a soft lens is generally easier than application. Three methods are commonly employed:

- The eyelids are held in exactly the same way as for application, and the lens is gently pinched off between a finger and the thumb. Ideally the lens should be moved off the cornea first. This can be achieved by placing a finger on the lens and sliding it down on to the lower sclera. Patients who omit this step may present at aftercare appointments with lower corneal staining which may mimic that associated with drying. For any patient who exhibits lower corneal staining, particularly in the 4 and 8 o'clock positions, it is worth checking how they remove their lenses

- Some patients find it easier to slide the lens temporally. When it reaches the outer canthus it will usually fold and pop out. Unfortunately it sometimes does so in a direction which is not entirely predictable, and the lens may be lost. This is probably the safest method for someone with long fingernails. However, cutting the nails would be preferable

- The lens can be removed by pinching it between the upper and lower lid margins, which are each controlled by a finger. This works best if has some stiffness, so it is more appropriate for a silicone hydrogel than it would be for a daily disposable lens. A wide palpebral aperture is also a prerequisite, in view of the large diameter of most soft lenses.

Whatever method is used, new patients should be seen to apply and remove their lenses at least three times. Established wearers should be observed at least once to ensure that their technique is safe. Occasionally,

they may need to be re-educated, particularly if they are damaging a lot of lenses.

Adaptation schedule

There isn't a lot to adapt to with a modern lens. Soft lenses are usually comfortable soon after first application, though those with thicker edges (eg torics) or a higher modulus (eg first generation silicone hydrogels) may take a little longer. It is customary to build up wearing time gradually, as an unsatisfactory lens will have less opportunity for mischief before it is noticed. Typically, the patient is instructed to wear the lens for four hours on the first day and add an extra two hours a day subsequently. In general, wear is restricted to eight hours maximum until the first aftercare appointment. Once the fit is deemed to be optimal, there seems little point in setting a maximum wearing time provided that it is understood that overnight wear is inappropriate to lenses intended for daily wear. If wearing time needs to be restricted beyond this, you need to fit a better lens (or a better patient). Patients rarely take much notice of arbitrary maxima for wearing their lenses and if they exceed them without any consequences the credibility of the practitioner will be forever compromised. A 10-hour maximum wearing time enthusiastically recommended by many optometry students is especially silly as the average working member of the population is likely to be travelling home and the authors do not recommend either removing or applying contact lenses while on the move. Restrictions on wearing time should be based on clinical findings suggestive of physiological compromise, not picked at random.

Provided that the instruction on



handling has not left the patient with too much trauma (and it is wise to check) it will boost confidence if the patient can leave the practice wearing the lenses.

Recognising normal and abnormal

It is important that the patient should be able to tell the difference between the normal symptoms that accompany adaptation to lenses and those circumstances that require intervention. In general, soft lenses are comfortable more or less immediately, and should remain so. Mild foreign body sensation may be expected with some torics, multifocals and silicone hydrogels, but it should soon reduce. Some lens awareness may be anticipated as the lens dries during prolonged wear. Significant redness and/or discomfort, especially if persistent after lens removal, should be recognised as abnormal. The patient should be advised to suspend lens wear and contact the practitioner promptly. Reduction in vision should elicit a similar response, though it might be worth checking whether the lenses are in the correct eyes before calling out the cavalry. Most patients have managed to mix up their lenses at some time, and one of the authors once managed to drive to work with both lenses in the same eye.

The Opticians Act 1989 (Amendment) Order obliges the last practitioner to participate in the fitting of the lenses to provide:

- A signed, written specification of the lenses fitted
- Instructions and information on the care, wear, treatment, cleaning and maintenance of the lens.

The specification should be issued once you are satisfied with the lens. This would normally be after the first aftercare appointment. The instructions



Figure 4 Example of an anti-bacterial lens case

on lens care must be issued at the time of collection.

Patients need to be aware of the possible consequences of poor lens care, and should have the opportunity to ask questions. It is worth reinforcing verbal instructions with written information, as much of the former may be forgotten. Most practitioners issue a standard consent form, which is signed by the patient (or guardian in the case of a minor) to acknowledge that the proper advice and instructions have been given. A copy should be kept with the clinical records, and one issued to the patient. The exact legal status of such declarations has never been tested in a British court, but it's better than nothing.

Frequently asked questions and advice

A number of common questions may arise upon collection of the lenses, or at subsequent appointments:

- If I don't wear these lenses every day, can I replace them less frequently than a month? The answer to this is no, as the lenses are only licensed for 30 days from the opening of the package. However, many patients do wear monthly lenses for longer (and daily ones too). Both the lenses and their care systems are not designed for more

prolonged life spans and the risk of both increased lens deposits (leading to inflammatory reactions) and microbial keratitis will increase

- Can I swim in them? Opinions vary on this, but there is an increased risk of microbial keratitis associated with both swimming and the wearing of lenses in hot tubs. For swimming the risk is slight if goggles are worn and the lenses are discarded immediately afterwards, but in general, prescription swimming goggles are a better option.

Patients should also be advised that tap water should not come into contact with the lenses due to the increased risk of *Acanthamoeba* infection. They should also never wear their lenses when unwell, as there is an increased risk of microbial keratitis (MK). Smokers (at least those under 30) are also known to be more likely to develop MK, but I have never encountered one who gave up the habit for this reason.

Aftercare

The new regulations place the practitioner under a duty to 'make arrangements' for the wearer to receive aftercare, without actually defining aftercare. This obligation applies in circumstances and over a time period which is reasonable in a particular case, but the patient should not leave the practice with lenses unless an aftercare schedule has been discussed, and the first appointment preferably booked. It is customary to see the patient 1-2 weeks after collection, but individual patients may require other intervals. Aftercare is dealt with in detail in a future article in this series.

Soft lens care regimes

The care of soft contact lenses used to be an involved and time-consuming process. Each step of the process required a separate solution or tablet which had



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to be diluted in another solution. Not surprisingly, patient compliance with these complex systems was indifferent, sometimes with unfortunate consequences. In particular, omission of surface cleaning was linked to an increased incidence of MK. Initially the choice was between systems based on heat disinfection and systems based on chemical disinfection. Both required separate cleaning solutions and frequently the use of enzyme-containing tablets to supplement them. The emergence of systems based on hydrogen peroxide overcame many of the problems associated with previous methods, but still remained somewhat complex. The trend in recent years has been towards 'multipurpose' solutions (MPS). These can be used for both cleaning and storage. Their popularity has coincided with the emergence of frequent replacement lenses, and they are formulated to work with modern lens materials and modalities. At present, these solutions are undergoing rapid evolution in terms of antimicrobial efficiency and cleaning performance as large manufacturers with large research and development budgets (and, it seems, even larger marketing budgets) compete for a market which has been curtailed by the widespread use of disposable lenses, which require no solutions. A two-part review of care systems will appear in *Optician* in the coming months. Here is a brief summary of some basic principles of care systems.

Sterilisation, disinfection and cleaning

It is important to differentiate sterilisation, disinfection and cleaning. Optometry students frequently employ the terms inappropriately and interchangeably.

Sterilisation involves the elimination of all living micro-organisms, including bacterial spores and *Acanthamoeba* cysts. This is achieved during the manufacture of lenses by the application of heat in an autoclave, typically 115°-118° for 30 minutes. When lenses arrive from the manufacturer they will be sterile. Once the lens vial is opened they will no longer be sterile.

Disinfection eliminates micro-organisms, but bacterial spores may survive. If lenses are not disinfected, microbial keratitis is more likely to occur. There are a number of reasons for this. Contact lenses do interfere with the ocular defence mechanisms. They prevent the efficient flushing of micro-organisms and organic debris from the ocular surface, and may reduce the

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1 For a patient who wishes to wear their lenses with make up, which of the following might be the best advice?

- A Apply lenses then make up. Remove make up then lenses
- B Apply make up then lenses. Remove make up then lenses
- C Apply lenses then make up. Remove lenses then make up
- D Never wear make up

2 Which of the following indicates a lens is inside out

- A The lens is unwearable
- B The profile of the lens shows a central concavity
- C The lens may be bent easily into a 'taco' shape
- D The edges on profile viewing are flared out

3 Which of the following may help a patient who finds the lens keeps sticking to their finger on application?

- A Small drop of solution on the inner lens surface
- B Dry the finger in contact with the lens on a lint-free cloth
- C Avoid pressing too hard onto the ocular surface
- D All of the above

4 What is the best advice regarding use of contact lenses in a hot tub?

- A Keep the head above water level
- B Ensure the water is chlorinated
- C Do not do it
- D Wear protective goggles

5 What percentage of lens cases are thought to be contaminated with harmful bacteria?

- A 15 per cent
- B 50 per cent
- C 75 per cent
- D 100 per cent

6 Which of the following best describes disinfection?

- A The complete removal of pathogens by heating prior to lens delivery
- B The use of irradiation to remove pathogens during manufacture
- C The manual rubbing of a surfactant to dislodge surface adherent pathogen
- D The elimination of micro-organisms by soaking in an antimicrobial solution

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level of fibronectin, which may enable bacteria to adhere more easily to the cornea. However, an important factor is the increased microbial population that accompanies lens application.

Cleaning and rinsing of contact lenses removes surface deposits and debris from the lens surface. It contributes greatly to the elimination of micro-organisms, and probably accounts for 99 per cent of the disinfection process if carried out efficiently. Given the degree of compliance of the average contact lens patient, cleaning alone cannot be relied on to ensure safe wear.

The lens case

The case that the lens is stored in is known to be an important potential source of infection. About three-quarters of all lens cases are contaminated with bacteria and sometimes these include *Pseudomonas* and *Serratia*. Additionally 8 per cent may have *Acanthamoeba* contamination. At one time patients used to hang on to their cases for as long as their lenses, ie years. By the time the case was retired, both it and the lenses it contained were often heavily

deposited and probably a health hazard, since patients rarely if ever cleaned them. In time the plastic from which the cases were constructed broke down, and some of the components released into the solution adversely affected its performance.

Some of these problems were addressed when manufacturers began to package new cases with their multipurpose solutions, but even now the human capacity for self-destructive behaviour can be a formidable adversary. For some reason, patients hang on to their old case like a favourite old jumper, even when they have a nice shiny new one available.

Recently CIBA Vision released the MicroBlock lens case, which is used with its Focus Aqua multipurpose solution. This is made from polypropylene and incorporates the inorganic antimicrobial silver. An antimicrobial lens case may be particularly effective against those bacteria that form biofilms. ●

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