

# Effective Steps for Ongoing CL Satisfaction

Sheila Hickson-Curran and Ella Ewens discuss the issue of compliance in contact lens wearers highlighting a survey that sheds light on non-compliant behaviours and UK practitioners offer tips on how to improve adherence to lens wear and care regimens.

Patients who do not adhere to their prescribed regimens exist in all areas of health care. Studies have shown that around 35 per cent of patients with glaucoma do not use their IOP-lowering drops as directed,<sup>1-3</sup> and 38 per cent of patients with Type II diabetes fail to adhere to their insulin regimens.<sup>4</sup> In the UK, compliance with asthma treatment is poorer still, between 40 to 70 per cent.<sup>5,6</sup> For hypertension, despite the greatly increased risk of stroke with non-compliance, only about 50 per cent of patients take at least 80 per cent of their prescribed medications.<sup>7</sup> The World Health Organisation estimates that only 50 per cent of patients with chronic diseases living in developed countries follow treatment recommendations.<sup>8</sup> Failing to take medication for these diseases can have a major impact on morbidity, mortality as well as a significant economic burden due to drug wastage, mismanagement of medical conditions and readmissions to hospitals.

As we know, contact lens wearers often do not fully adhere to their practitioners' instructions on how to safely wear

and care for their contact lenses (CLs). A recent large scale analysis by Morgan *et al* found that full contact lens compliance is rare, 15 per cent for daily disposable (DD) wearers and almost zero per cent with all other lens types.<sup>9</sup> Fortunately, serious negative consequences such as microbial keratitis (MK) are uncommon, but the rarity of serious complications may actually reinforce poor lens wear and care habits.

"The only step that patients comply well with - is putting their lenses on in the morning," says Brian Tompkins an optometrist from Northampton. "Every other step beyond that they are unlikely to adhere to."

London Optometrist Bhavishna Ben adds "Many patients want to be compliant, and their intentions are good. While patients start off well, they develop bad habits over time and if they don't experience any negative consequences, this can make them even more non-compliant."

## HOW TO COMMUNICATE

- Give clear and concise verbal and written instructions at initial appointments
- Demonstrate the cleaning routine especially rubbing and rinsing lenses and case cleaning
- Develop a rapport with the patient
- Consider modern technology and communication methods for contact lens wear and care instructions
- Children and teens can be just as compliant as adults. Clear, child-friendly instructions and parent support can help to improve compliance
- Go over lens wear and care regimes at aftercare visits and ask patients to show how they care for their CLs and cases

## WHAT TO COMMUNICATE

- Select a simple yet effective regime
- Explain the reasons why the contact lens wear and care regime given will achieve successful contact lens wear
- Advise patients about exposing contact lenses to water, in particular when swimming
- Emphasise that no tap water should come in contact with the contact lens or case
- Repeat key points to reinforce good contact lens wear and care behaviour

## Key Areas for Compliance

The evidence in the literature on a wide range of contact lens compliance steps was summarised and categorised in a recently published paper according to the degree of clinical importance associated with skipping or irregularly performing each step.<sup>10</sup> In the same paper, the results of two online surveys to assess how well wearers of reusable (two-weekly and monthly replacement) CLs adhere to common guidelines for healthy lens wear were reported. To avoid biasing respondents to report better compliance than they actually practiced, the surveys were completed at home or other locations and they were not in any way associated with eye care visits or their eye care practitioners' practices.

The 645 contact lens wearers (ages 12 to 39) were members of a consumer panel and were asked about lens replacement frequency in a sponsored masked survey. A separate panel of 787 contact lens wearers (ages 18 to 39) was asked, again in an online survey, about a wide range of contact lens-related behaviours, including hygiene, cleaning practices and case replacement. The results of both surveys, especially in the context of the literature on each topic, provide ample evidence that patients need to be educated continually about the wear and care of their lenses.

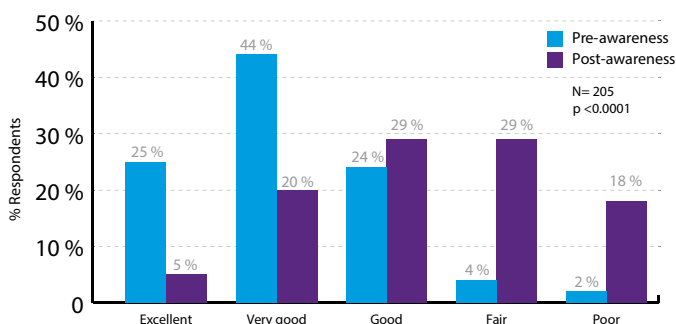
## Hand Washing and Lens Replacement

Before handling lenses patients should wash and dry their hands, rinse their lenses correctly with solution (depending on modality and care regimen) and adhere to their replacement schedules. Of these steps, poor hand washing is the activity most closely associated with an increased risk of infection.<sup>11</sup> According to the survey outlined above,<sup>10</sup> just a little more than half the respondents (56 per cent) washed their hands with soap before handling lenses in the morning.

While this might seem like a basic hygiene step that we shouldn't need to mention, Simon Donne, an optometrist from Bedford, says "Patients comply poorly with hand-washing, and they don't understand the negative consequences of not washing hands properly before handling contact lenses. Good hand-washing technique takes at least 20 seconds, and anything a patient can do save time and cut corners, they will."

Do eye care practitioners perform good hand washing techniques themselves? A recent survey of over 200 eye practitioners at THE VISION CARE INSTITUTE® asked them to evaluate their hand washing technique.<sup>12</sup> Following participation in practical workshops using a UV disclosing gel to demonstrate effectiveness of their hand-washing technique, they re-evaluated their rating. Results showed

a significant shift in self-rating scores once awareness about correct hand hygiene had been raised. Sixty-nine per cent of practitioners rated themselves excellent or very good initially, compared with only 25 per cent post demonstration.



**Figure 1:** Summary of Practitioner Responses to 'How good are you at washing your hands?' Pre and Post awareness Training.<sup>12</sup>

Patients' compliance with lens replacement schedules has been a major topic of discussion amongst practitioners and contact lens manufacturers. Several studies suggest a relationship between modality and compliance,<sup>13, 14</sup> with most researchers agreeing that patients who wear DD lenses exhibit the most compliant behaviours.<sup>15, 16</sup> The simplicity of the DD modality makes it easy to explain and remember.

Recent research also suggests that DD lenses are associated with less inflammatory events than reusable lenses,<sup>17, 18</sup> and one study found up to 12.5 times lower risk of infiltrates with DD lenses compared with reusable lenses.<sup>19</sup> However, one study found infectious keratitis rates higher in DD wearers than reusable soft lens wearers, although there was a fair amount of wear abuse in that cohort and a specific brand of DD lenses drove the increased rate.<sup>20</sup> It appears that DD lenses may be the preferred choice not just for compliance reasons, but for reduced complications also.

Dumbleton and colleagues reported that compliance with a replacement schedule, regardless of modality, is associated with better comfort and vision at the end of the day and at the end of the wear cycle.<sup>21</sup> Other research also suggests that comfort declines and unscheduled visits for clinical complaints, such as dryness, increase with longer periods of wear, even within the recommended replacement cycle.<sup>22, 23</sup>

There is not much data about the safety implications of over-wearing frequent replacement lenses beyond the recommended replacement schedule; recent studies that have attempted to make such connections have some limitations.<sup>13, 14</sup> If patients are not prospectively randomised to modality, the more frequent replacement groups are likely to contain a greater proportion of patients who were

prescribed a shorter replacement cycle by their practitioners specifically because those patients are compliance-challenged, prone to allergy or have already experienced an adverse event, hence biasing the sample.



**Figure 2:**  
*Hand with UV disclosing gel showing typical hand-washing inadequacies.<sup>12</sup>*

The results of the lens replacement survey referenced here indicate generally low compliance with practitioners' recommendations on replacement frequency.<sup>10</sup> Morgan and colleagues found the compliance rate in the UK with two weekly lenses was similar to that of monthly lenses,<sup>24</sup> suggesting that replacement frequency has little effect on compliance. Rather, compliance is a function of three factors:

- how well patients understand the wear schedule
- their desire to comply
- if they remember to make time in their busy lives to change their lenses on schedule.

Another factor is what instructions patients are given by their practitioners, and this isn't always well controlled. In one recent US study, for example, 49 per cent of the prescribing optometrists recommended a replacement schedule other than two weeks for patients wearing lenses the manufacturer recommended for two-week wear.<sup>21</sup> This makes the question of compliance murkier, because a patient may be following his practitioner's instructions, but the practitioner has recommended a replacement frequency that differs from the lens manufacturer's recommendation.

In the UK, non-compliance with replacement schedule may be less common as patients are often signed up to regular lens and solution supply with payment by direct debit schemes, which makes them more likely to adhere with their lens care and replacement schedule. Also, practitioners can mail out lenses and solutions to patients, thereby improving compliance with replacement schedules and follow-up appointments also. In the UK, the popularity of DD lenses may also increase lens wear and care compliance compared with other countries where DD usage is lower.

"Smartphone applications, email and electronic reminder

services such as ACUMINDER® are a great and convenient way to help patients remember when to replace their lenses" Donne says. Tompkins adds "Contact lens education needs to be via a medium that makes sense for patients - pieces of paper just get lost or forgotten. Manufacturers could design simple to use contact lens apps for clear instructions and reminders." Tompkins uses high-tech in practice software to play videos of contact lens instructions and information to the patient in various places throughout the practice; this can even be emailed to the patient following their consultation.

Scott Mackie of Mackie Opticians, Bothwell also uses technology to reinforce compliant behaviour. "Taking an anterior eye photograph with a digital slit lamp, creates a real 'wow' factor for the patient. I email a photo of their eye before contact lens wear to the patient's smart phone, and showing them their baseline appearance, and explaining what steps they must take to remain at this optimal level of eye health, really helps to encourage compliant behaviour."

According to the Global Mobile Health Market report, 1.4 billion people will own smart phones by 2015—and about 500 million of them will be using health-related applications for their mobile devices.<sup>25</sup> With all these computer-literate, smart phone savvy patients, practitioners should stay on top of the latest high-tech approaches to reminding them about contact lens replacement and office visits. Some options to consider are summarised in Table 1.

### Compliance Education in the Digital World

- Popular calendars, including Microsoft Outlook Calendar, Google Calendar and Apple's iCal, all allow users to establish recurring calendar appointments or tasks with reminders that pop up on the screen and sync to smart phones, too.
- App stores already boast a total of 17,000 mobile health applications. Many contact lens reminder applications exist for the iPhone, BlackBerry and Android.
- ACUMINDER® ([www.acuminder.co.uk](http://www.acuminder.co.uk)) is a free service which sends an automatic reminder via email and/or text message on when to change their lenses, when to buy their lenses, when to schedule and eye examination regardless of the brand of lenses they wear.
- Some contact lens cases have in-built reminder systems – such as LensAlert® and DigiCase which remind the patient when to change their lenses and their case
- Manufacturer and organisation websites have application and removal videos to demonstrate to patients, along with helpful leaflets on lens wear and care;  
<http://www.bcla.org.uk/>  
<http://www.aclm.org.uk/>  
[http://www.acuvue.co.uk/inserting\\_lenses](http://www.acuvue.co.uk/inserting_lenses)

**Table 1**

## Cases and Cleaning

Considering current patterns of contact lens case cleaning, exposure to tap water is highly likely. More than half of survey respondents (53 per cent)<sup>10</sup> reported that they rinse their cases with warm or hot tap water, and 19 per cent said they rinse with cold water (Table 2).

### Lens Exposure to Tap Water<sup>10</sup>

Lens case cleaning method involving certain or possible exposure to tap water	(N=787)
Rinse lens case with warm or hot tap water	53 %
Wash lens case with soap	20 %
Rinse lens case with cold tap water	19 %

Table 2

“Patients definitely need educating about tap water as they don’t see it as unclean.” Ben says. “After all, we do wash in it. When we say, ‘rinse your case,’ they assume we mean with water. We need to be very clear about the fact that tap water should never come into contact with soft contact lenses.”

Exposure of contact lenses to water is implicated in the development of corneal infections. Acanthamoeba keratitis, whilst rare, has been associated with swimming.<sup>26</sup> However, a study was conducted to examine whether wearing goggles while swimming limited bacterial colonisation on contact lenses.<sup>27</sup> Fewer bacterial colonies were found on goggled contact lenses, thus suggesting goggles offer some protection against bacterial colonisation of contact lenses while swimming.

We should warn the patient about wearing lenses during sporting activities such as swimming and other water sports. Exposing contact lenses to water during swimming or while showering or in a hot tub may increase the risk of eye infection from microorganisms. Many practitioners recommend using DD lenses which are removed after swimming and/or wearing tight goggles over lenses when swimming.

### Case care

Case care remains one of the areas that is often overlooked. A review article looked at the contact lens and case hygiene advice given by three different groups: manufacturers of contact lens disinfecting solutions, the FDA, and optometrists in New South Wales, Australia.<sup>28</sup> This report found that case cleaning instructions were inconsistent, and limited recommendations were available about drying positions, rinsing, and rubbing of lens cases. In contrast, contact lens care instructions were comprehensive although some confusion remains around rubbing and rinsing.

Best practice for lens case care to reduce pathogens such as *Pseudomonas aeruginosa*, *Serratia marcescens* and

*Staphylococcus aureus* common in lens case biofilm is digital rubbing and rinsing with disinfecting solution and/or wiping the lens cases with a tissue.<sup>29</sup> Air drying face down on a tissue is the preferred drying method.<sup>30</sup> Although for some anti-microbial cases, the case should be left moist, capped and upright-as the moisture may aid in the anti-microbial action of the silver ions, so the manufacturer’s instructions should be followed.<sup>31</sup>

Of even greater concern than how patients clean their cases is the finding that many rarely if ever clean them. In the survey, only 26 per cent of respondents reported cleaning the case daily.<sup>10</sup> The median was two to three times per week, and one in three respondents reported that they clean their case monthly or even less often (Figure 3).

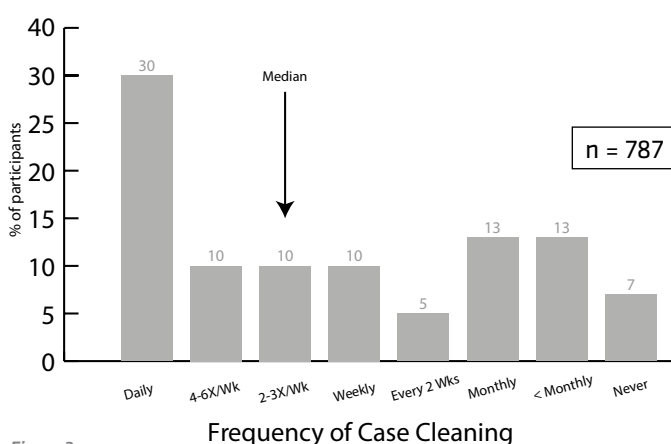


Figure 3: Survey results of how often patients clean lens cases.<sup>10</sup>

The ideal interval for case replacement is unknown. The Food and Drug Administration of USA (FDA) recommends replacement every 3 to 6 months. The BCLA recommends replacement every month,<sup>32</sup> and practitioner advice varies from one to three months although some never give any advice on this topic. About 40 per cent of respondents have said they use a lens case for a full year or longer.<sup>10</sup> Contact lens solution manufacturers vary in their recommendations from advising to replace storage cases every month to replacing as directed by their practitioner.<sup>31, 32, 33, 34</sup>

‘Topping up’ or failing to completely empty and replace the contact lens disinfecting solution in the case, is a common practice that was linked to the *Fusarium* keratitis outbreak a few years ago.<sup>35</sup> Less than half the respondents (46 per cent) in the survey said they fill the lens case with solution every evening, meaning that the other half performs this necessary step irregularly.<sup>10</sup>

Donne adds “While solutions are easier and simpler to use these days, with contact lens solution, unlike your milk which, if you leave out of the fridge will go off, there are no visible signs of it going bad. So the patient think it’s okay to just keep topping up and not checking expiry date. They don’t realise that that this can greatly increase the risk of complications.”

Rubbing lenses is another aspect of the cleaning regimen that is often ignored. Although the literature is quite clear that rubbing helps to remove the microbial load on the lenses,<sup>36, 37</sup> and may play an important role in preventing MK,<sup>38, 39</sup> the “no rub” language on many multipurpose solution labels has left many patients understandably confused. The majority of the survey respondents (75 per cent to 77 per cent) omit this step.<sup>10</sup>

Tompkins explains “No-rub solutions, although less common now, are still an issue and it is important to communicate well and educate the patients on the negative consequences if lenses are not cleaned properly. I often highlight key risk factors, so they understand why you are asking them to take these steps.”

### Overnight Wear

The most important risk factor for MK is overnight (ON) contact lens wear (prescribed or not). Epidemiological studies have shown the rate of MK with ON wear of soft CLs has remained steady at four to 10 times the rate with daily wear.<sup>40-42</sup> ON wear is also associated with higher rates of corneal infiltrates.<sup>43-45</sup>

Tompkins, an advocate of ON wear, says “For those whose eyes are suitable, ON wear reduces the number of procedures that patients need to conduct with their lens wear and care.” The number of care steps involved in various modalities has previously been compared,<sup>46</sup> highlighting that DD lenses need 120 steps per month, reusable lenses 210 (when using a multipurpose solution) compared to extended wear with only four steps per month. While ON wear is a significant risk factor for MK, this analysis highlights the reduction in care steps and improved convenience that extended wear can offer some patients – although it has not led to a reduction in infection rates compared to daily wear.

Patient prescribed lenses for extended wear need to be regularly monitored and advised of the risks of this modality. Additionally, daily wear patients should be told of the potential risks of sleeping in their lenses as it is an area that is commonly linked with non-compliance.

### Making a Difference

Solving the compliance puzzle requires that we first understand the reasons for poor compliance, which can be grouped into three general categories: 1) Patients who do not understand instructions; 2) Patients who ignore instructions, believing “nothing bad will happen”; and 3) Patients who forget or procrastinate.<sup>47</sup> Each of these reasons requires a different approach. Full compliance is challenging for patients; they must listen to their practitioner, understand the importance of each step, follow what the practitioner tells them to do and

remember it exactly. In contact lens practice, many factors for non-compliance are implicated, including time pressures on practitioners and contact lenses, in particular DD lenses, being promoted as a “no hassle” option to highlight their ease and convenience of use.

Becker and Maiman first described the health belief model for medicine in 1968 to help explain the reasons behind non-compliance in general health.<sup>48</sup> It outlines that for full compliance to occur the patient must first consider their susceptibility to the condition, the severity of that condition and then whether they can prevent it and the barriers to compliance. This model has since been adapted for contact lens wear (Figure 4).<sup>47</sup> It is important to therefore highlight that non-compliance has negative consequences and that these can be severe. Patients need to understand that complying can significantly reduce the chance of adverse events occurring and practitioners need to suggest steps to make compliance easy. For instance, not sleeping ON in lenses will reduce the risk of potentially sight threatening MK, carrying a spare contact lens case and solution are easy habits the patient can adopt.

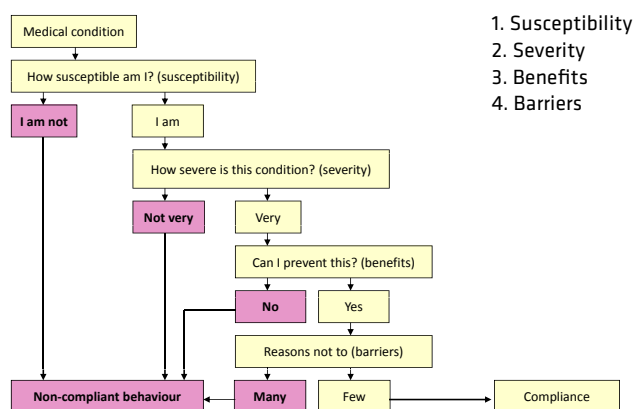


Figure 4: The Health Belief Model as adapted by Sokol et al.<sup>47</sup>

When patients don’t understand practitioner instructions, or the reason for them, more education is needed. Donne says “If a patient comes home at three in the morning, 40 seconds to care for their lenses and case seems like a lot. Also, if there are no consequences as a result, they think it’s fine and their non-compliant behaviour gets reinforced. It may be that they haven’t had their instructions explained properly the first time - patients need simple and easy to follow instructions. Carefully observe their behaviour at the aftercare visit and provide instructions and reinforcement where necessary.”

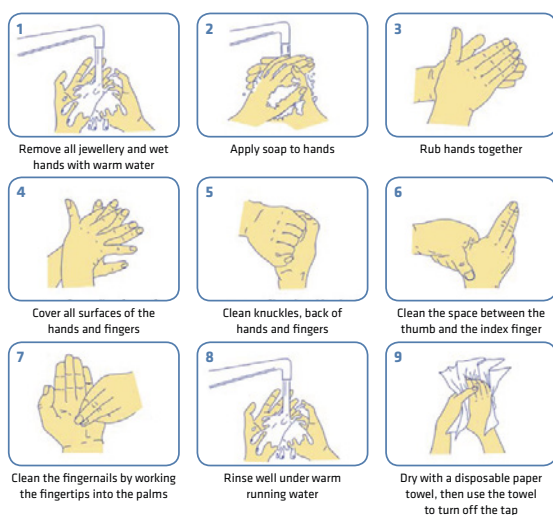
What should you do when a patient ignores your instructions because he believes nothing bad will happen? Mackie remembers his troublesome patients who rarely comply with wear and care regimes. “While you don’t want to inadvertently scare patients, sometimes images of possible complications can be suitable. The word “ulcer” is pretty scary and that

seems to be a deterrent for most patients!" However, whilst MK is serious and vision threatening, the risk is very low.<sup>17</sup> So an alternative approach is to discuss the more common consequences, such as discomfort or reduced satisfaction if lenses are not replaced on time, or if correct wear times and care regimes are not followed. This avoids the 'it won't happen to me response' from patients when warned of the risks of a rare eye infection. They may relate better to the feeling of dryness and discomfort when they over-wear their lenses, and they are motivated because they want to continue lens wear for years to come. "We advise patients to change lenses before they have a problem – when you start to feel your lenses being gritty, or your vision is blurry –it's too late" says Donne.

It may be that certain types of patients are simply more likely to be non-compliant. A recent study was conducted on safety and compliance patterns by age.<sup>18</sup> The CLAY study showed that the youngest contact lens wearers (ages 8 to 15 years) had a very good clinical safety profile. They are under their parents' guidance, have access to care and they show a high rate of success with lens wear. In the 16 - to 25 - year olds, however, there is a higher rate of corneal infiltrates and other events that interrupt contact lens wear. So practitioners might want to rethink how they prescribe for this age group and rather than looking for the cheapest option for students, consider DD lenses for this compliance-challenged group.

## Help Prevent Infection WASH YOUR HANDS

Wash for at least 20 seconds



### When should I wash my hands?

- Before, during and after food preparation
- Prior to eating
- After using the toilet
- After touching animals or animal waste
- After touching the nose or mouth
- Prior to handling contact lenses
- After changing nappies
- Whenever hands are dirty



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## Conclusions

Busy lives, procrastination and forgetfulness are all major factors in contact lens noncompliance. Just as we don't all floss our teeth or exercise as often as we should, patients lose track of dates and forget to carry out key steps in the care regimen. If practitioners focus on changing the behaviours with the greatest clinical impact and providing convenient reminder tools, they can help bring patients closer to full compliance. "You don't wait until your hands are chapped and bleeding to apply hand cream, the same applies for contact lens wear and care. We must encourage our patients to take all the steps to look after their eyes before a problem occurs" concludes Donne.

## Acknowledgement

This article was originally published by Contact Lens Spectrum in January 2012, and modified for publication in Optician in November 2012. Some additional information has been added including insights from eye care practitioners in the UK.

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**Figure 5:** In-practice posters, such as this one from THE VISION CARE INSTITUTE®, can help improve patient compliance

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