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History and Symptom Taking in Contact Lens Fitting and Aftercare

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Abstract

Aim: To appraise history and symptom taking for contact lens consultations, to determine current practice and to make recommendations for best practice.

Method: The peer reviewed academic literature was reviewed and the results informed a survey completed by 256 eye care practitioners (ECPs) on their current practice and influences.

Results: The last eye-test date, last contact lens aftercare (for existing wearers) and reason for visit are key questions for most ECPs. Detailed use of contact lens questions are more commonly applied in aftercares than when refitting patients who have previously discontinued wear (87% vs 56% use), whereas questions on ocular and general history, medication and lifestyle were generally more commonly utilised for new patients than in aftercares (72% vs 50%). 75% requested patients bring a list of their medication to appointments. Differential diagnosis questioning was thorough in most ECPs (87% of relevant questions asked). Attempts to optimise compliance included oral instruction (95% always) and written patient instructions (95% at least sometimes). Abbreviations were used by 39% of respondents (26% used ones provided by a professional body).

Conclusion: There is scope for more consistency in history and symptom taking for contact lens consultations and recommendations are made.

Keywords: history; symptoms; compliance; risk factors; differential diagnosis; abbreviations; prescribing influences

Introduction

Collecting thorough history and symptoms information at patient visits is critical to contact lens suitability, selection and management, yet few academic studies in this area have been published. The aim is to comprehensively elicit relevant information in a concise manner as time is limited in a clinical setting, but missing information can result in suboptimal clinical decisions and patient management. Clinical records have been found to underestimate actual care provided,¹ suggesting record keeping isn't always as comprehensive as it should be. The objectives for a new patient include: to determine the suitability for contact lens wear based on an analysis of patient-specific indications and contraindications as part of a risk benefit analysis; to guide the patient as to the most suitable lens modality and type based on their lifestyle (including occupation), aspirations for lens wear and financial outlay when considered in conjunction with the outcome of ocular health examination, refraction and binocular vision; to ensure expectations (such as visual outcomes, range of clear focus, myopia control, wearing time and lens care requirements) are realistic; to collate baseline patient information to justify clinical decision-making and to allow future changes to be examined at aftercares; and to ensure the compliance implications of contact lens wear are communicated.² Contraindications are often interpreted as a reason not to fit contact lenses, but in most cases with management of the condition or a change in contact lens choice, successful and safe lens wear may be achieved. For example, patients with compromised ocular health such as meibomian gland disease,³ low tear stability⁴ or recurrent epithelial erosion need the condition to be managed before soft or corneal RGP lenses are fitted, but therapeutic lenses could be part of that management in extreme cases. Tear film related problems can be exacerbated by contact lens wear due to the thickness of

lenses relative to the tear film and the lens material and design's interaction with the ocular surface and adnexia (such as the eyelids) changing the composition of the tear film through stimulating inflammation and binding to protein and lipids.⁵ If patients have extremely flat, steep or irregular corneas or the ocular surface needs protection, then therapeutic contact lenses may be appropriate such as sclerals. However, manual dexterity to apply and remove lenses and maturity, mental capacity or willingness for compliant use may increase the risks of wear beyond the potential benefits.

Pointer⁶ examined the open-question regarding issues with the patient's eyesight typical at the beginning of a consultation and demonstrated that uninterrupted statements of greater than 30 seconds were unlikely to provide useful additional information. How a contact lens consultation history and symptoms interview is conducted will depend on whether it is an initial fitting where past history, motivation, intended wearing pattern and environment will be the focus, compared to an aftercare where symptoms, changes in health and compliance aspects are foremost. Hence 'history and symptoms' changes to 'symptoms and (changes in) history' for an aftercare. Comprehensive capture of relevant information in a limited time requires a structured approach, the ability to differentially diagnose and the appropriate use of abbreviations. This work builds on previous studies to improve the evaluation and recording of soft and gas permeable contact lens fit,^{7,8} surveying current practice by eye care practitioners across the world in this area and uses the results to propose the refinement of practice based taking of history and symptoms on current academic evidence.

Method

A web based survey was developed by the British University Committee of Contact Lens Educators (BUCCLE) which comprises of all the academic based contact lens educators in the UK and Ireland. BUCCLE is sponsored by industry and consists of two educators from each UK and Ireland institution which teaches contact lenses. The group meets three times per year with the aim of enhancing the teaching of contact lens education.⁹ Brain storming and current UK teaching curriculum refined the survey to assess the following areas:

- Which questions were standardly asked in history and symptoms, separated into on initial fitting and at aftercares (Table 1)
- Medication data capture and use
 - Request patients to bring a list
 - Look up potential side effects
 - Look up potential drug interaction
- Differential diagnosis of reported pain or discomfort (Figure 1)
- Patient compliance
 - Attempts to optimise with:
 - Written instructions
 - Oral instructions
 - Reminder texts / telephone calls
 - Share animations
 - Aspects discussed (Table 2)
 - Verification (patients asked to describe or demonstrate)
 - Lens cleaning
 - Lens case cleaning

- Hand washing
- Abbreviations used, including for reporting absent or normal results (such as no staining)?
- Prescribing
 - History and Symptom Derived Prescribing influences
 - Presumed compliance (such as hygiene, attitude and personality)
 - Convenience / time pressures of the patient
 - The patient's finances
 - The responses to a different lens in each eye
 - Patients reported lifestyle / visual requirements
 - Brand loyalty / trust
 - Continuing Professional Development
 - How many lenses /care solution brands are available and used in practice
 - Spherical soft
 - Toric soft
 - Soft for presbyopia
 - Care solutions

Data on respondent's profession, principal working environment, number of years qualified and geographic location were also collected. The on-line survey was circulated through the British Contact Lens Association to eye care practitioners attending the 2014 annual conference.

| | New wearer | Aftercares |
|--|------------|------------|
| o Last eye examination date | 96% | 79% |
| o Last contact lens aftercare | - | 86% |
| o Reason for visit | 93% | 90% |
| Use of Contact Lenses (if previously worn for new wearer) | | |
| o Brand/type of lenses worn | 57% | 82% |
| o Modality of wear | 71% | 89% |
| o Daily wearing time | 68% | 94% |
| o Comfortable daily wearing time | 45% | 80% |
| o Days worn per week | 63% | 93% |
| o End of day dryness | 41% | 78% |
| o Care system used | 50% | 90% |
| General Ocular Health | | |
| o Any problems with your eyes | 93% | 94% |
| o Any surgery | 80% | 39% |
| o Any previous infections | 87% | 63% |
| o Ever been to hospital / GP about your eyes | 86% | 51% |
| o Any problems with your vision in general | 88% | 84% |
| o Any problems with your vision specifically at distance/intermediate/near | 77% | 74% |
| o Any discomfort/pain | 73% | 86% |
| o Any problems with eyes in the family | 81% | 31% |
| General Health | | |
| o How is your general health | 95% | 68% |
| o Any allergies | 94% | 57% |
| o Diabetic | 80% | 40% |
| o Thyroid problems | 32% | 10% |
| o System inflammatory conditions | 32% | 12% |
| o Dermatological conditions | 37% | 14% |
| Medication | | |
| o Are you on any medication | 96% | 73% |
| o Record frequency | 30% | 22% |
| o Record dose | 24% | 18% |
| Lifestyle | | |
| o Occupation | 92% | 55% |
| o Visual tasks | 85% | 61% |
| o Daily environment | 67% | 49% |
| o Hobbies | 79% | 50% |
| o Typical working distance | 54% | 35% |
| o VDU use | 88% | 61% |
| o Driver | 91% | 61% |
| o Smoker | 59% | 34% |

Table 1: Questions standardly asked in history and symptoms (excluding specific compliance issues), separated into on initial fitting and at aftercares. N=256.

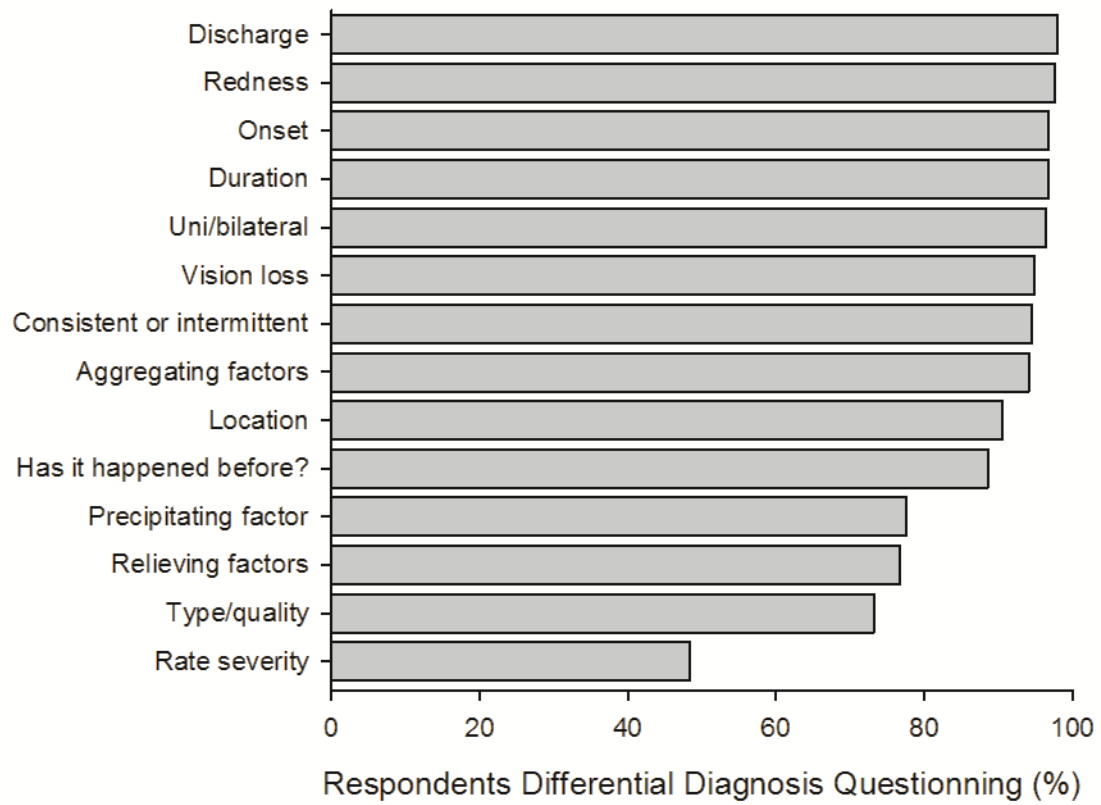


Figure 1: Questions asked to differential diagnose anterior eye complications from symptomology. n=254.

Results

The survey had 256 respondents, 88% from the UK and Eire and 8% from mainland Europe [n=217-222 of participants in the survey gave their demographics]. Most were experienced practitioners with 24% qualified more than 30 years, 22% 21-30 years, 19% 11-20 years, 10% 6-10 years and 24% qualified 5 years or less. Most were primarily in clinical practice (82%; n=181) and 19% were academics (n=19). The majority were trained as optometrists (85%, n=189) or contact lens opticians (14% n=30).

Structure [n=256 respondents]

Questions standardly asked in history and symptoms (excluding specific compliance issues), separated into on initial fitting and at aftercares are presented in Table 1.

Additional related comments were:

- Reason of opting for contact lenses /expectations (n=5)
- Time that lenses were inserted today / age of lenses worn today (n=3)
- Can you wear the lenses as you wish (days per week, hours per day)? (n=2)
- Any stinging, redness or discomfort on insertion? (n=2)
- Ask patient to give a score out of 10 for quality of distance, intermediate & near vision, particularly presbyopic lens wearers (n=2)
- If I had a magic wand is there anything they would like improved? (n=2)
- Was there a time since the last visit during which you could not wear the lenses and if so, what was the reason?
- How long do the lenses take to settle?
- What comfort drops are used and how often?
- How well do your contact lenses work for you at the moment? Any times when they get sticky or gritty or smeary?
- Are there any other concerns regarding your eyes/vision/contact lenses that you would like to talk to me about?

- Is there a change in comfort over the life of the lens?
- Headaches, diplopia, flashes and floaters
- Family history specifically of age related macular degeneration

Medication data capture and use [n=249 respondents]

Of respondents, 75% (n=182) reported requesting patients bring a list of their medication to appointments (58%, n=142 only sometimes), 90% (n=219) look up potential side effects (80%, n=194 only sometimes) and 68% (n=160) look up potential drug interactions (65%, n=148 only sometimes). Related comments were (each n=1):

- Refer to resident pharmacist
- Look things up only if relevant e.g. if there are problems
- Look up only if I don't know
- Advise patients to check their medication leaflets for warnings about dryness or eye / vision interaction

Differential diagnosis [n=254 respondents]

Questions asked to differential diagnose anterior eye complications from symptomology are reported in Figure 1. Additional differential diagnosis questions included:

- Do you have any photophobia? (n=9)
- How does the symptoms relate to whether you are wearing the lenses or not? (n=3)
- Are the eyes watery? (n=2)
- Any related itch or allergies? (n=2)
- Any postural element - does it hurt more/less when lying down?
- Any recent systemic health problems?

Patient Compliance [n=206-240 respondent]

Attempts to optimise compliance included written patient instructions (42% n=99 always and an additional 53% n=125 sometimes), oral instructions (95% n=225 always, 4% n=9 sometimes), reminder texts and/or telephone calls (15% n=32

always, 30% n=65 sometimes) with 29% of respondents sharing animations (n=60, 25% sometimes n=51). Additional comments were:

- Show pictures of patient's eye if any lesions. (n=3)
- Discuss at every after care appointment. (n=2)
- Go through British Contact Lens Association (BCLA) compliance sheets with them.
- Refer patients to Efron/CCLRU grading scales.
- Get patients to download an app to remind them when to change their contact lenses.
- Use manufacturers leaflets and/or College of Optometrists tear off pads
- Use a non-confrontational manner - patients often complain other practitioners talk down to them or "tell them off"
- Write down on record card, what I advised orally.

Aspects discussed with patients [of n=240 respondents] are presented in Table 2.

Additional compliance discussion related comments were:

- Always mention not to swim or shower in lenses without goggles. (n=6)
- Use a highlighter and underline in manufacturer's instructions.
- To change lenses regularly and NOT when they start to hurt!
- When a bottle of solution finishes it means that also the life of the case finishes.
- Smoking is becoming more of a rarity - I find it less necessary to discuss.
- Asking smokers not to smoke is a waste of time.

Verification of elements of compliance was assessed by asking patients to describe or demonstrate (respectively) lens cleaning (70%, n=169; 23%, n=57), lens case cleaning (62%, 149; 6%, 14) and hands washing (33%, n=79; 43%, n=104) of the 240 respondents that completed this section.

| COMPLIANCE ASPECT | Ignore | Occasionally Mention | Mention | Promote | Promote / Emphasise |
|---|---------------|---------------------------------|----------------|----------------|--------------------------------|
| ▪ Regular lens cleaning | 1% | 4% | 19% | 0% | 77% |
| ▪ Rubbing and rinsing | 1% | 5% | 16% | 0% | 78% |
| ▪ Regular lens case cleaning | 3% | 12% | 28% | 1% | 56% |
| • Spray with solution | 49% | 18% | 18% | 1% | 15% |
| • Toothbrush rub | 69% | 24% | 5% | 0% | 2% |
| • Tissue rub | 62% | 23% | 7% | 0% | 8% |
| • Air drying face up | 49% | 20% | 16% | 0% | 15% |
| • Air drying face down on a tissue | 43% | 16% | 15% | 0% | 27% |
| ▪ Regular lens case replacement | 4% | 6% | 23% | 0% | 67% |
| ▪ Where lens cases are stored | 33% | 23% | 23% | 1% | 20% |
| ▪ Sharing lens cases | 45% | 22% | 15% | 0% | 18% |
| ▪ Solution top-up | 22% | 10% | 25% | 0% | 43% |
| ▪ Use of tap water | 5% | 1% | 14% | 0% | 80% |
| ▪ Importance of lens replacement schedule | 2% | 2% | 18% | 0% | 78% |
| ▪ Sleeping in contact lenses | 3% | 5% | 22% | 1% | 70% |
| ▪ Risks of internet lens supply. | 21% | 30% | 35% | 0% | 13% |
| ▪ Need to stick to prescribed solutions. | 12% | 13% | 38% | 0% | 37% |
| ▪ Washing hands | 1% | 3% | 12% | 0% | 84% |
| ▪ Infection risk | 3% | 3% | 25% | 0% | 69% |
| ▪ Checking solution expiry dates. | 20% | 24% | 35% | 0% | 20% |
| ▪ Not smoking | 30% | 32% | 29% | 0% | 9% |

Table 2: Compliance aspects discussed with patients. n=240.

Abbreviations [n=184-211 respondents]

Abbreviations were used by 39% (n=83) of respondents (n=211), with 26% (n=55) using ones provided by a professional body. Reporting absent or normal results was notated as “no” by 24% (n=44), “none” by 33% (n=60), “normal” by 23% (n=43), “NAD” by 10% (n=18) and “Clear” by 45% (n=83) of respondents (n=184) with 16% (n=33) using 2 notations and 7% (n=14) using 3 notations for different aspects.

Additional comments were:

- Use abbreviations taught as part of my university training. (n=2)
- Standardised abbreviations used within branch / chain. (n=2)
- Use 0 (n=16), healthy (n=5), white (n=3), quiet (n=3), nil (n=3), [-] (n=1) to record an absent or normal result.
- Grade as 0 where possible to avoid having to record an absent or normal result. (n=26)

Prescribing [n=220-222 respondents]

Prescribing influences are presented in Figure 2. The number of lenses /care solution brands available and used in clinical practice (respectively) were; range 2-50, median 8 / 1-20, median 5 for spherical soft; 0-27, median 5 / 1-14, median 3 for toric soft; 0-20, median 4 / 0-10, median 3 soft for presbyopia; and 0-20, median 4 / 1-10, median 3 for care solutions.

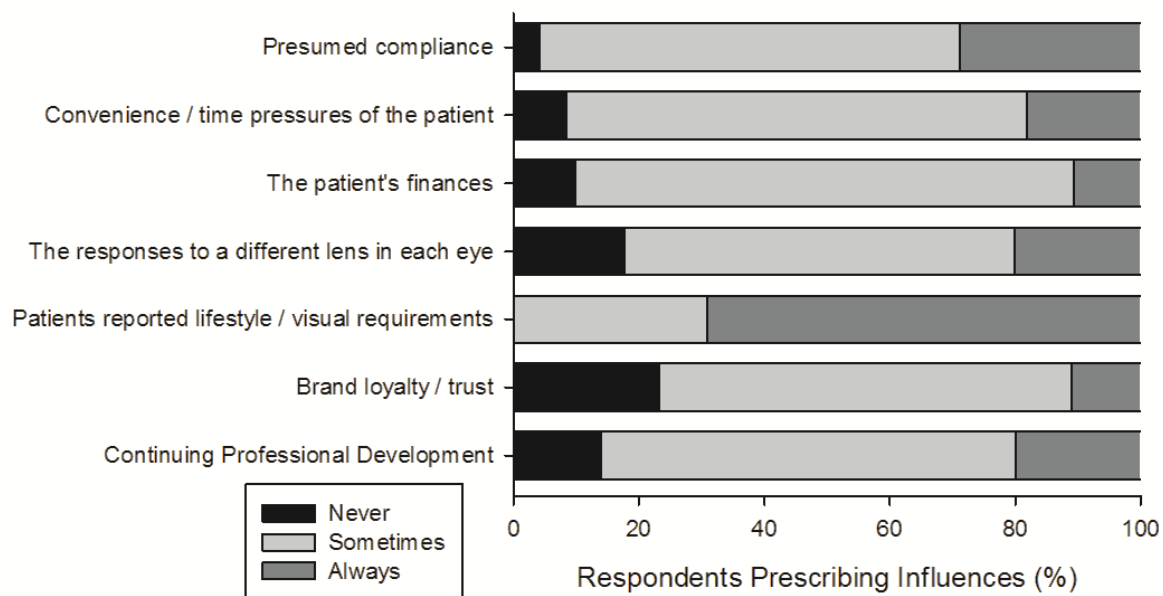


Figure 2: Contact lens prescribing influences reported by Eye Care Practitioners. n=222.

Discussion

Traditionally a history and symptoms interview during an eye examination would be structured in the following order: reason for visit, ocular history, medical history, medication, family history and social history. For contact lens consultations, reason for visit could include the motivation for lens wear including cosmesis, scheduled aftercare (which may also report symptoms) or unscheduled visit due to symptoms. The management of symptoms includes the determination of any underlying pathology through differential diagnosis, optimisation of lens fit if inadequate and finally, alteration of lens features such as material, replacement frequency, care regimen or other factors such as the use of artificial tears, nutrition, and environmental modifications.¹⁰

When the patient is or has been a contact lens wearer, the type of lens worn, lens modality, the cleaning regimen (and ease of compliance), the time since fitting (and why care is no longer being provided by the original lens fitter) or discontinuing (and what led to this), any changes in lens type or modality and the rationale for these should be recorded. Average daily wearing time, comfortable wearing time, any napping or overnight wear should be elicited. The number of hours of wear at the time of consultation and how long it has been since the last aftercare help to determine the significance of any clinical signs seen during subsequent ocular examination such as corneal solution induced staining,^{11,12} as well as indicating likely future patient compliance. Lens brand and care system recall is generally poor, but is much enhanced using photo-prompts.¹³ The survey in this study identified that most eye care practitioners (ECPs) agree that the last eye examination date, last contact lens aftercare (for existing wearers) and reason for visit are key questions for the start of any consultation. Detailed questions on the use of contact lens are more commonly applied in aftercares than for patients who have discontinued wear at some point, but are equally important to optimise contact lens wear for the individual patient.

Various mnemonics have been suggested for the investigation of pain in the medical literature such as LOFTSEA (location, onset, frequency, type, self-treatment, effect on patient, associated symptoms), SQITARS (site and radiation, quality, intensity, timing, aggravating factors, relieving factors, secondary symptoms), and

SOCRATES SOCRATES (site [unilateral or bilateral], onset [gradual or acute], character [such as throbbing], radiation, association [any other signs], time course [duration], exacerbating/relieving factors and severity).¹⁴ Systemic issues such as flu should not be forgotten as these can be linked with the development of complications.¹⁵ It is important to enquire about possible precipitating/aggravating factors such as history of foreign body insertion or trauma, any eye itchiness or seasonal variation, or anyone in the family who has similar eye problems (e.g. transmission of viral conjunctivitis can occur from sharing towels). Differential diagnosis of reported pain or discomfort in this sample of ECPs was reported as fairly comprehensive and far superior to that found in pharmacy practice (although these studies used actual questioning of a mystery shopper);^{16,17} important additional aspects commented upon were asking about photophobia, whether the symptoms related to the wearing of contact lenses or not, whether there is an itch sensation and whether there were any recent systemic health problems.

Non-compliance with recommendations for contact lens wear, care regimen, and lens replacement schedules has been reported in the academic literature since the mid-1980's.^{18,19} Non-compliance is common throughout the world²⁰ and perceived compliance is not a good indicator of actual patient behaviours.²¹ Non-compliance has consequences which range in severity from reduced comfort on insertion and at the end of the day,²² dryness and inferior vision²³ to an increased risk of microbial keratitis from sleeping in lenses not prescribed for this purpose.²⁴ Other physiological signs of non-compliance include deposition on the contact lenses,^{18,19,25} corneal staining^{18,19,26} and increases in papillae and hyperemia.^{25,27} Risk taking tendencies has been linked to compliance and while not an easy direct question, they may become apparent from hobbies.²⁸

The key compliance issues are:²²

Failure to Replace Lenses when Scheduled

Reuse of daily disposable contact lenses is motivated largely by wanting to save money (60%) and occurs in ~9% of patients (varying by country with 18% in Australia, 12% USA, 7% in UK to 4% in Norway). Over half of patients wearing fortnightly and monthly lenses have been found not to follow the manufacturer's or optometrist's replacement schedule recommendation.^{13,29} In both cases, failure to

replace lenses when scheduled was linked with lower reported comfort on insertion and on lens removal.^{13,22}

Sleeping in Contact Lenses

75% of daily disposable contact lenses admit to napping in their lenses and 28% sleeping in them at least once a month. Sleeping in lenses at least once a week to a fortnight increases the relative risk of moderate and severe microbial keratitis.^{24,30}

Inappropriate lens purchase and supply

Internet purchase of lenses rather than from a contact lens practice appears to prevent patients from receiving the education, clinical care and follow-up required and has been shown to be associated with a greater risk of developing microbial keratitis.^{24,30}

Use of tap water and failure to wash hands

Patients feel they have been poorly instructed on the use of storage cases and tap water and have a general lack of awareness with respect to hygiene such as hand washing.²²

Failure to clean and replace cases regularly

Poor case hygiene has also been associated with a greater risk of microbial keratitis.^{24,30} The lens storage case is rarely cleaned (only 25% every or most days), tap water is generally used (67%), the cap is left on by 76% of patients and the case is only dried open, face down as recommended^{31,32} in 10% and in this North American study only replaced monthly in 12% of patients.²²

Inappropriate use of care systems.

Infrequent use of care systems has been shown to be a risk factor for both microbial keratitis and sterile keratitis in daily wear users,³³ as has failure to wash hands.^{34,35} Failure to rub and rinse lenses also carries a greater risk of developing microbial keratitis³⁶ and leads to higher rates of signs and symptoms.¹³ In both the relatively recent outbreaks of *Fusarium* keratitis and *Acanthamoeba* keratitis, topping up, rather than the required completely replacing solutions, was shown to be associated with a greater risk of infection.^{37,38} Use of tap water to rinse is linked with higher rates of gram negative bacterial contamination.³⁹

Contact lens wearer attitudes linked to compliance (in order of strength) have been shown to be:²²

- Consequences (lack of understanding of the seriousness of poor compliance noted, but conversely some patients worried about the potential damage to a contact lens of rubbing. A large proportion of the participants thought that the purpose of cleaning their lenses was simply to remove surface deposits rather than remove microorganisms)
- Instructions (importance of and reasons for cleaning/replacing lenses needed)
- Routine (change of routine linked to forgetting to remove/clean lenses)
- Convenience (promoting the flexibility of daily disposables can enhance compliance, whereas convenience can drive swimming in lenses)
- Time (not prepared to take the time to rub and rinse lenses)
- Values (importance of eyesight and health enhances compliance, whereas lack of guidance leads to on-line purchase of lenses)
- Financial (care system choice based on cost rather than recommendation)

The “Prospect Theory” approach (successful in smoking research)⁴⁰ was recommended, promoting the gain from performing an action such as improved vision and comfort from replacing lenses when scheduled (gain-framed) rather than advising that they might experience poor vision discomfort if the patient is non-compliant (loss-framed). While compliance improving strategies have been much discussed, these have either not been tested^{41,42} or not been successful, such as the implementation of a regular review exercise,⁴³ combining written and oral instructions²⁷ although this can improve case cleaning compliance³⁹ and intense instruction and reduced cost care products, although re-instruction enhances,^{44,45} probably as anxiety is highest during communication interaction which will reduce information retention.⁴⁶ Compliance is better in those prescribed with daily disposable lenses.²⁰

ECP attempts to optimise compliance were found in this survey to be mainly oral questioning, sometimes with written guidance despite the potential benefits.³⁹ Newer technology such as texts and sharing animations are being used by half of ECPs to some extent. While general aspects of compliance such as regular lens cleaning (including rubbing and rinsing), lens case cleaning, sleeping in lenses and avoiding tap water are strongly promoted / emphasised to patients, the specifics of how to achieve best evidence-based results are not. Very few practitioners are willing to

highlight the risks of internet supply!^{24,30} With limited contact time with patients and limited patient oral retention,⁴⁶ comprehensive, but concise written guidance should be provided to all patients. Despite the known risks of smoking,^{30,47,48} it was rarely raised with patients and its importance was questioned in some of the additional comments. Demonstrating lens and case cleaning and to a lesser extent hand washing was rarely requested of patients, with ECPs content with description to check some aspects of compliance.

Ocular history relevant to contact lens suitability and lens choice includes recurrent inflammatory conditions (such as iritis) and those with corneal involvement (such as herpes simplex keratitis),⁴⁹ previous eye surgery or trauma (such as laser refractive surgery that will affect corneal topography and sensitivity as well as tear film stability).^{50,51} Due to hormonal changes during pregnancy and lactation, such patients may be prone to corneal oedema and mucus build-up potentially affecting comfort.⁵² The tear film may also be affected by puberty, menopause and while taking oral contraceptives or hormone replacement therapy, although the evidence for this is contradictory.^{53,54} General ocular health problems with eyes and vision were asked by most ECPs in this survey whether the patient is new to contact lenses or it is an aftercare, whereas discomfort and pain questioning is more common for existing lens wearers. Conversely, questions about surgery, previous infections, hospital and general practitioner visits about eyes and any problems with eyes in the family are asked less at aftercares, presumably as a general question about any changes since the last visit should capture such events.

As with ocular history, general health questions were less frequently asked at aftercare appointments and specific health issues such as dermatological, thyroid problems and systemic inflammatory conditions were much less frequently asked compared to diabetes and allergies. Medical history relevant to contact lenses includes: atopy particularly if there is an ocular component;⁵⁵ diabetes which should not prevent successful soft contact lens wear but requires more frequent monitoring due to the potential for increase fragility of the epithelial tight junctions and decreased corneal sensitivity;⁵⁶ dermatological conditions such as seborrheic dermatitis, atopic eczema and acne rosacea, all of which are strongly associated

with anterior/posterior blepharitis⁵⁷ systemic inflammatory disease such as sarcoidosis which may be associated with ocular inflammation (uveitis);⁵⁸ and thyroid eye disease and other conditions that affect eyelid position or tone impacting the tear film.⁵⁹

The role of family history specific to contact lens wear is not well explored, but may identify that the patient has an as yet undiagnosed condition. The genetic link in keratoconus is well known, but a family history is not linked to its severity.⁶⁰ Myopia has a generic link, but this does not influence progression.⁶¹ Atopy is also a hereditary condition⁶² as are corneal dystrophies⁶³ and dry eye has some family history association.⁶⁴ The risk of your patient having an identified familial genetically linked condition is influenced by the age of onset in the family member (for example dry eyes and cataract) and the form of the condition (such as diabetes types I and II)⁶⁵ so this information should also be recorded.

Medication history should include that which is for systemic conditions (often not reported)⁶⁶ and self-medication (such as over-the-counter). In this survey, medication was asked about by ECPs for new wearers more than at aftercares, but in both cases the frequency and dose was often ignored. Full reporting should include the dose and frequency as well as the pharmaceutical name. Three quarters of ECPs reported asking patients to bring a list of their current medication, saving valuable contact time with the patient and reducing the risk inaccuracies,⁶⁷ and many look up potential side effects and drug interactions. In almost 90% of cases this was reported as occurring only sometimes, which suggests either a very good knowledge of the effects of current medication, or variable practice. There is little point in recording medication unless potential effects on patient management are explored such as drug interactions and ocular side effects. This is best achieved by using software which can be more up to date and aid patient recollection of pharmaceutical names than a practitioner's memory. Preservatives in ocular medication are renowned for causing allergic reactions which may explain the development of a red eye. Many systemic pharmaceuticals have dry eye listed as a possible complication, such as

including antihistamines, nasal decongestants, tranquilizers, certain blood pressure medicines, Parkinson's medications, birth control pills and anti-depressants.⁶⁸

Apart from asking the usual questions such as occupation and whether the patient drives, social history should cover patient risk factors. Risk factors for moderate and severe microbial keratitis in daily wear contact lens users included solution type (multipurpose compared to other care solutions), high socio-economic status and smoking.³⁰ The risk factors for microbial keratitis also include extended wear.²⁴ Lens care product was not associated with increased risk of corneal infiltrative events, but the use of reusable soft contact lenses, silicone-hydrogel use and extended/continuous wear were, as well as being male and smoking.^{47,48} Certain occupations and hobbies may require eye protection as well as contact lenses. While research is not conclusive about the effect of the environment on contact lenses,¹⁰ dusty environments and exposure to ultra-violet light should affect contact lens choice.⁶⁹ Instead of asking about occupation and hobbies where responses such as retired explain little of the patients visual demands and risks, questions such as “What do you do during your working day?” and follow up “So what do you do when you are not at work?” may be more effective. In this research, lifestyle questions were asked more of new wearers than at aftercares as expected, although less for questions about typical working distances used and smoking. The need to re-ask lifestyle questions at aftercares is questionable, except when a patient reports a significant change or they become presbyopic.

Abbreviation use in contact lenses has not previously been reported in the academic literature. Abbreviations were only used by about two-fifths of ECPs in this survey, with most of these using those suggested by a professional body. Absent or normal result are most often recorded as “clear”, but a wide range of abbreviations were reported. These may reflect the business the eye care practitioner works for or restrictions of electronic recording systems. Ticks are inadequate as they indicate something is there, not healthy. Noting whether a disease condition is not present can be recorded as “no”. Where grading physiology is recommended at every visit, then the grade is sufficient to indicate the tissue has been inspected. It is important that for staining the stain used, such as fluorescein or lissamine green, is noted. For

iris, the colour should be reported as this can affect issues such as sensitivity.⁷⁰ Media or lens can be reported as “clear” if no abnormalities or loss of transparency is evident.

Contact lens prescribing habits across the globe are relatively well understood from a yearly survey conducted by Morgan, Efron and colleagues,⁷¹ however, what influences these trends is less well understood. ECPs in this survey reported their prescribing was influenced by a range of factors which demonstrates the complexity of clinical practice. However, presumed compliance is known to be a poor indicator of real compliance,²¹ the patient’s financial situation is rarely actually known and it is an ECPs responsibility to gain appropriate continuing professional development to enhance their practice, so the results suggest that more education is still needed for ECPs to appropriately prescribe for patients.

Recommendations

The following recommendations follow from this research and the evidence base from the academic literature.

Ask all patients about the date of their last eye examination and aftercare (if an existing contact lens wearer) and their reason for this visit. Review lens type, modality, wearing time, comfortable wearing time (including end of day discomfort) and lens cleaning regimen with existing lens wearers. Ask new patients about their general ocular and systemic (atopy, diabetes, allergy and diabetes) health, family ocular history (keratoconus, atopy, corneal dystrophies, diabetes, dry eyes and refractive error), medication (requesting patients bring a list to the appointment is recommended) and lifestyle, but for aftercares this can be covered by a general question about any changes or the patient reviewing a summary of their previous notes.

Differential diagnosis of pain or discomfort should include questions on any discharge, redness, vision loss, photophobia, itch or recent systemic health problems; whether it is unilateral, consistent or intermittent, related to the wearing of contact lenses or not and severity; and location, reoccurrence, type/quality of the sensation, aggravating factors, relieving factors, onset and duration.

Oral and written guidance should be given to try to optimise lens care compliance, based on evidence based specifics of how to achieve best practice such as the need to daily clean lens storage cases with sterile water, rubbing with a clean tissue and allowing to air dry face down with the cap off.^{31,32}

Abbreviations can be used, but they must be easily understood by others achieved by adopting those developed by professional bodies. At the end, complete the history with a review for example by summarising with key points, and summarise back to the patient to make sure you haven't missed anything important.

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