THE VISION CARE INSTITUTE™ of Johnson&Johnson Medical Ltd

Initial Patient Assessment

KEY POINTS

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'Open' questions rather than 'closed' ones should be used to encourage each patient to provide as much information as possible

All aspects of the subjective and objective questioning and examination should be conducted with a clear idea of how the information will either assist in the choice of lens or help in the future monitoring of the contact lens wearer

Throughout the examination, the patent should be kept informed of the procedures being conducted and the reasons for any decisions. An informed patient is a better patient

Public awareness of the benefits of contact lens correction is arguably higher today than at any time in history, thanks largely to advertising and public relations. And significant advances in contact lens technology, materials and design mean that more patients can comfortably wear contact lenses. Yet despite these factors, the number of contact lens wearers in Europe remains significantly less than in the US, Japan or much of the Pacific Rim. There are two main factors keeping this penetration to the low levels. Firstly, there is a lack of proactive recommendation by eye care practitioners and, secondly, there is a high incidence of contact lens drop-outs. Correct patient selection and pre-screening is a key element in addressing both these issues.

The initial patient selection for contact lenses must be made in conjunction with the patient in the context of explaining to them that contact lenses could be a viable vision correction option. Several studies confirm that proactive contact lens prescribing introduces contact lens wear to patients who previously assumed they were unsuitable.[1,2] Market research continues to show the number one concern of most patients is the perceived discomfort/fear of having a lens on the eye. The challenge facing practitioners is to match these physiological and emotional needs to products.

Although ocular topography is rarely a barrier to modern contact lenses, ocular anomalies, pathology and patient motivation remain significant factors restricting the number of contact lens wearers. Many of the factors should, and can, be screened for at the initial fitting. Beyond the desire to increase the number of patients successfully wearing contact lenses, the practitioner has ethical and legal obligations. Patients must be offered the most suitable and safe correction for their needs and practitioners must ensure their records clearly note pre-assessment and assessmentbaseline measurements of the contact lens wearer. The need to communicate with the patient is heightened with the increasing choice in materials, designs and replacement frequencies available. The practitioner has an ethical obligation to inform patients of any new material, modality or lens design that could improve their wearing success. Failure to do so could result in legal issues should the patient later have problems with their lenses. It also ensures that practitioners are seen to be up to date with new developments.

TABLE 1

Influence of contact lenses in different environments[5]

ENVIRONMENT	LENS TYPE	
	SOFT	HARD
Metal splinters	++	-
Burning grit particles	++	-
Particle contamination, moderate	+	-
Particle contamination, heavy	-	-
Strong infra-red radiation	-	?
Underwater, splashes	+-	+-
Dry environments	+-	+-
Extreme cold	+	+
Solvents, gases, short exposure	++	++
Solvents, gases, long exposure	?	?
Acids, strong, splashes	++	++
Acids, weaker, splashes	++	++
Alkalis, strong, splashes	+-	?
Alkalis, weaker, splashes	+-	++

++ certain protection
+ makes no difference
+- possibly unfavourable
- unfavourable
? not fully studied

Aftercare begins before the first contact lens is even placed on the eye. Patient selection and pre-screening thus become part of the aftercare process.

Instrumentation

Pre-screening contact lens wearers requires three basic techniques: observation, measurement and communication. The key instruments — the slit lamp and the keratometer — are discussed in detail in other articles in this series. However, a few pertinent points relating to pre-assessment are mentioned here.

Ideally, the slit lamp should be fitted with an eyepiece graticule, or at least have an adjustable slit height to assist in recording both the size of lesions in the anterior segment and measurements of horizontal visible iris diameter (HVID) and pupil size. Measurement using the graticule is ideal as it is easy and accurate. The crude technique of using a hand-held ruler is not to be recommended. Problems of parallax, vertex distance and lack of divisions on the millimetre scale reduce accuracy and reliability.

Baseline measurements and initial assessment of ocular tissue appearance can be more accurate and repeatable by using grading scales such as the IER (Figure 1), or Efron grading scale.[3] The increased accessibility of digital photography should also be considered in taking base line measurements. Use of a photographic slit lamp enables the practitioner to photograph any pre-existing lesion so that this can be compared with any subsequent changes. Consideration must also be given to the keratometer as more than an instrument solely for measuring corneal radius. The keratometer can be used to measure non-invasive break-up time (NIBUT) of the tear film, well established as a more accurate record of tear film stability than the use of fluorescein.

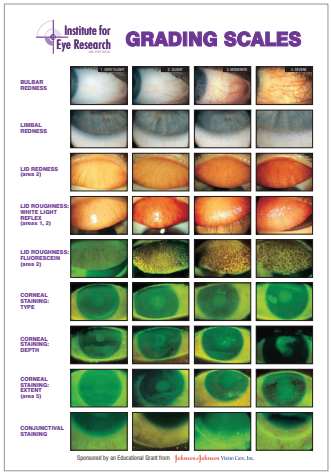


FIGURE 1 Institute for Eye Research (IER) photographic scales

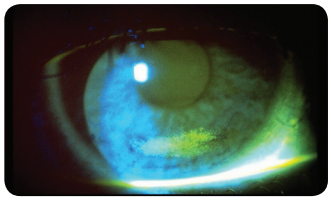


FIGURE 2 Corneal desiccation secondary to incomplete blinking

Techniques

As in refraction, it is important that a standard routine is followed during the contact lens screening examination. Developing a routine ensures a full procedure is carried out efficiently. While there are no hard and fast rules as to the order of a routine, it is customary to start with the patient discussion before moving on to the preliminary examination.

Patient discussion

Initial discussions with the patient are arguably the single most important aspect of a preliminary examination. A correct understanding of the patient's working environment and lifestyle is important, as well as an understanding of the patient's vision requirements and expectations.

With presbyopic vision correction any option will have its limitations, so an informal discussion about the patient's needs will assist in choosing the most suitable option. For example, the benefits of gaze independent vision offered by simultaneous vision contact lenses may outweigh any small reduction in vision clarity. Establishing this before fitting will save both practitioner and patient considerable time and money. Each piece of information gathered at this stage should be collected with a purpose and should help the practitioner decide which contact lens is best for the patient.

Before considering individual aspects of the history and symptoms, it is worth underlining the importance of questioning technique. Questions can be defined as 'open' or 'closed'. A closed question — for example, 'Is your general health good?' — is less likely to get a comprehensive response than an open question such as: 'Tell me about your general health.' The second question invites the patient to divulge information, whereas a negative answer to the first requires more probing by the practitioner.

An even better approach would be: 'How would you describe your general health? This is important to help me decide which lenses are most suitable for your eyes.' This explains why the practitioner needs the information and is more likely to prompt a full answer.

Effective communication also relies on responsive listening and appropriate body language on the part of the practitioner. It is critical that the practitioner looks interested in hearing what the patient has to say. Studies have shown that, on average, it takes a patient 90 seconds to fully explain why they are visiting a surgeon. On average, the surgeon interrupts after just 18.[4] The practitioner should maintain eye contact whenever possible. Notes should be made in a deliberate and considered manner, and if there is ambiguity about a point then the practitioner needs to stop the patient and make sure that the point is understood by both parties.

In a medical environment patients remember just 30 per cent of what they hear. The practitioner must make sure that all important and salient points are understood by the patient.

The main areas for consideration in patient discussions are as follows.

Occupation

In some occupations contact lens wear is not permitted, in others it may be contraindicated. Occupational requirements can be found from various organisations and the prospective contact lens wearer should be made aware of any occupational restrictions. Contact lenses may be contraindicated for

patients working in dusty environments or environments in which toxic fumes are present. Consideration should also be given to patients working long hours at computer screens. Studies have shown the blink rate reduces during computer use, which can lead to corneal desiccation. The increase in air-conditioned offices is a further exacerbating element in contact lens dryness often associated with long term computer screen work.

While computer use is usually not a contraindication for lens wear, the practitioner will want to ensure this does not become a problem by alerting users to the importance of blinking. Many patients will put up with the discomfort associated with office work in the belief that there is little that can be done to remedy the situation. Traditionally the options to the practitioner were largely limited to re-wetting drops, but today the increase in choice of materials, some of which include wetting agents, means that there are multiple ways to manage contact lens dryness. Significant difference in patient comfort exist when different lens types are used for computer activities.[6]

Recreational activities

The desire to wear contact lenses for playing sport may be an important motivation for the potential contact lens wearer. There are certain simple points which should be taken into consideration when fitting a patient who wants to wear lenses for sport.

Soft lenses are usually the first choice for most sports and contact sports in particular. However, while all contact lenses have some protective effect on the eye, they are not as efficient as protective eyewear for some high-risk sports, such as squash.

For water sports, the patient must be made aware of the need for high levels of hygiene due to the potential for the increased risk of infection. Swimming in contact lenses may carry a higher risk of microbial keratitis and the risk of *Acanthameoba* keratitis is highly associated with swimming in contact lenses. In both cases the accommodation of microbes on the lens surface during swimming is a likely cause of the infection.[7] Patients must be warned about the increased risk when swimming and should be advised, if they still wish to swim in lenses, to wear tight fitting goggles and pay particular attention to their lens cleaning regime or advise daily disposable lens wear. The onus is on the practitioner to provide the patient with the information required and all patients should be informed that swimming pools, and jacuzzis in particular are higher risk environments. Contact lenses have been successfully worn for sub-aqua pursuits.[8]

There is increasing evidence to suggest that UV radiation can be harmful to ocular tissues. UV-blocking contact lenses help provide additional protection to the cornea, lens and retina, especially against entry of UV light at the temporal limbus. However, in pursuits involving exposure to high concentrations of ultraviolet light, such as skiing, the patient should be advised to wear wrap-around sunglasses or goggles to offer glare protection and to prevent damage to the conjunctiva, lid margins and surrounding skin.

Patient's age

While there is no maximum age, or indeed minimum age, at which a patient can wear contact lenses, the practitioner has to appreciate the changes that take place in the ageing eye. The physiological changes that occur with ageing are summarised in Table 2. The presbyopic patient will require special management. However, the practitioner should also consider the effect changing from spectacles to contact lenses would have on all contact lens wearers. Most myopes of more than −4.00D will notice the increased accommodation and convergence needed for close work with contact lenses and should be forewarned of this.

Fitting contact lenses to children can be especially rewarding, and most commonly considered from the age of eight upwards. When considering fitting children with contact lenses the practitioner needs to assess the maturity and ability of the child to look after the lenses. This discussion needs to take place with the child's parents. Patient dexterity also needs to be considered, but deficiencies can often be overcome by greater attention to the teaching of patient handling techniques.

TABLE 2

The effects of ageing on the eye (adapted from Woods[9,10])

OCCULAR CHANGES	VISUAL PERFOMANCE
Decreased tonus of upper and lower eyelids	Decrease in visual acuity (reduction greater for low contrast targets and under low luminance)
Reduced palpebral aperture	Reduction in contrast sensitivity for higher spatial and temporal frequencies
Decreased lacrimal secretion	Potential reduction in stereo acuity
Reduced tear stability	Increased glare sensitivity
Corneal changes - decreased sensitivity - increased fragility	
Ocular media changes	
Decreased pupil diameter	
Effects of increased intake of systemic drugs	
Increased incidence of corneal age-related disorders	

Complexion

Patients with auburn hair and freckled skin have increased corneal sensitivity. Blue-eyed and fair-skinned patients also have relatively sensitive corneas and are more likely to have problems adapting to lenses, especially rigid lenses.

Motivation

Assessment of a patient's needs and degree of motivation for contact lenses must be made. Nelson and West[11] concluded from a small study that stable, well-adjusted extroverted people were more likely to adapt to contact lenses without difficulty than anxious, introverted and less stable personalities.

Patients who are highly motivated and comply with instructions have an increased probability of success. Discussions should take place to allow the practitioner to assess the expectations of the patient with regard to contact lens wear. Part of the discussion should also include the opportunity to discuss refractive surgery. Many patients who have had problems with contact lenses in the past might register an interest in surgery without realising how much contact lenses have changed. It is important that the patient be given a balanced and objective perspective of all the vision correction options that are open to them.

Unrealistic expectations need to be discussed and the limitations of any chosen lens type and wear modality explained. Patient expectations are a key factor in the success or failure of contact lens wear.

Financial considerations

Practitioners should not pre-judge a patient's ability to pay. The main focus should be on the prospective wearer's visual needs. The practitioner should present the most suitable lens to the patient, but it is the patient who should make a decision with regard to the financial commitment.

Never assume financial status. Patients must be made aware of the ongoing costs of contact lens wear and care.

Smoking

Studies show that smokers are more likely than non-smokers to develop microbial keratitis.[12] Patients who smoke should be warned of this.

Ocular pathology

Contact lens fitting is indicated in the management of several ocular conditions — keratoconus and monocular aphakia, for example. Fitting in the presence of active pathology should never be undertaken without the prior approval of an ophthalmologist.

TABLE 3

Possible effects of systemic medications and general health status on contact lens wear

CONDITION	POTENTIAL PROBLEM	MEDICATION	POTENTIAL PROBLEM	ADVICE
Allergies	Preservative reactions Atopic reaction to deposit build-up	Antihistamines	Atopic conjunctivitis Contact lens associated papillary conjunctivitis Reduced contact lens tolerance	One-day disposable contact lense or non-preserved systems with frequent replacements lenses Monitor – check for dry eyes
Skin condition (eg eczema)	Excessive deposits Lid irritations Blepharitis Punctate keratitis			One-day disposable or frequent replacement lens Thin edge design Avoid contact lens wear until clear Monitor – do not fit if clinically significant
Diabetes	Reduced epithelial healing			Close monitoring
Thyroid dysfunction	Tear deficiency and poor blinking			Avoid contact lens wear
Vitamin A deficiency	Mucus deficiency deposit build up			Monitor – possible soft frequent replacement
Systemic hypertension		ß-blockers, diuretics	Dry eye	Monitor
Psychosis	Contact lens adaptation	Psychotics	Dry eye	Monitor – contact lens wear possibly contraindicated
Hormone changes eg birth control, pregnancy, menopause	Dry eye Corneal contour changes Changes in corneal sensitivity	Oral contraception	Dry eye	Monitor

Previous contact lens wear

The high number of contact lens dropouts in Europe means a high likelihood of previous contact lens wearers presenting to the practitioner. In many cases these patients will not broach the subject of contact lens wear as they will feel that, having failed once, they are not suitable. It is important for the practitioner to probe the reasons why the lens wear was discontinued and see if, assuming that these reasons could be overcome, the patient would be interested in resuming lens wear. The most common reasons for contact lens drop-out include discomfort, dryness and poor vision. In many cases these conditions can be addressed with new materials, for example, silicone hydrogel, or updated replacement frequencies, such as daily disposables, or modern toric lens designs.[13]

Dry eyes

Possibly one of the most common reasons for failure to wear contact lenses is dry eye. Much debate remains as to the best way to assess the dry eye. The use of specific questionnaires has received some validation in the literature and is recommended as a way of screening for potential dry-eyed patients. The McMonnies[14] questionnaire and the Dry Eye[15] questionnaire are examples widely used in dry eye research. Key areas to explore are the frequency of the symptom, the presence of discomfort and whether the patients lifestyle is affected.

Overall health and medication

As well as considering general health and the effects of systemic medications on overall ocular performance, practitioners should be aware of conditions and medications which may have a direct impact on a patient's ability to wear contact lenses. Table 3 outlines some of these conditions and suggests management options.

Allergies

Approximately 25 per cent of the population suffer allergies at some time in their life. This number varies as a function of the climate and will also be complicated seasonally with around 10 per cent who report they suffer from hay fever. It is important for the practitioner to understand the atopic history of the patient as this can impact lens and care product selection. Daily disposable lenses should be the first choice for patients who have ocular symptoms associated with allergies.[16]

Ocular history

Full consideration should be given to a patient's ocular history as well as to pathology, dry eye and motivation given the degree of ametropia. Potential problems due to muscle imbalance should be considered, given the lack of prismatic effect (assisting or not) in contact lens correction. Any previous contact lens-wearing history should be fully explored, and any reasons for past failures noted. Details of any previous refractive surgery should be investigated.

FOR EXAMPLE:

-5.00/-2.00x180 @ 10 mm

transposes to:
-5.00x90/-7.00x180 @ 10 mm

which from vertex correction tables becomes:
-4.76x90/-6.54x180

and then
-4.75/-1.75x180

Patient examination

Before examining the anterior segment, the practitioner must obtain a baseline refraction, perform a binocular assessment and undertake an ophthalmological examination of the patient's eye. Refraction must be recorded as the ocular refraction, taken as the spectacle refraction with compensation for back vertex distance. It is important that in an astigmatic correction both meridians are treated independently in cross cylinder form (see example at left).

This becomes particularly important in the ordering of soft toric lenses and calculation of tear film powers in rigid gas-permeable (RGP) lenses.

Anterior segment measurements

The improved accuracy of measurements with the slit-lamp graticule has already been discussed. The following measurements should be recorded.

Horizontal visible iris diameter (HVID)

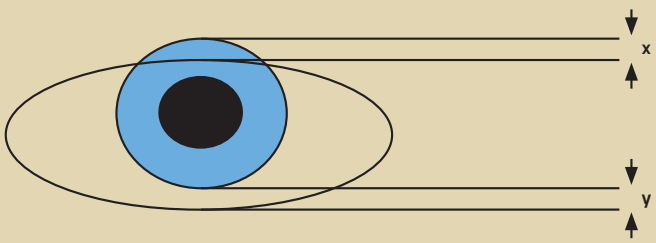
The horizontal visible iris diameter underestimates the horizontal cornea by just under 1mm. Its value lies only in ensuring that a soft lens total diameter is sufficient to maintain full corneal coverage.

Vertical palpebral aperture

The measurement of palpebral aperture is of questionable value in contact lens fitting other than in the monitoring of its size longitudinally. Of more relevance, especially for RGP and bifocal lens fitting, is the position of the lids with respect to the limbus. This can be recorded as shown in Figure 3.

FIGURE 3

A method of recording the position of the lids with respect to the limbus



Superior x mm

Inferior y mm

Corneal coverage =
-ve, corneal exposure +ve

Preliminary contact lens examination

PATIENT DISCUSSION	PATIENT EXAMINATION
Personal details • Name, address • Age • Dexterity • Complexion • Occupation, recreation **Contact Lens specific** • Expectations • Motivation **General History** • Systemic disease history • Familial disorders • Motivation **Ocular history** • Refraction correction past • Ocular disease history • Ocular symptoms	**Full eye examination** • Vision • Refraction • Binocular assessment • Ophthalmoscopy **Measurements** • Corneal curvature • Corneal diameter • Pupil size • Palpebral aperture **Examination of anterior segment** • Lids and lashes • Conjunctiva • Tears • Cornea epithelium stroma endothelium
ASSESSMENT OF SUITABILITY	

FIGURE 4

Pupil size

Pupil size measurement allows the practitioner to predict, and manage, any likely flare from a misalignment of the pupil diameter with the back optic zone diameter of a rigid lens. It is also an important variable in predicting rigid bifocal contact lens success. An estimation of maximum pupil diameter may be made by viewing with the Burton lamp in a darkened room.

Tear prism height

The height of the inferior tear meniscus gives a useful guide to the volume of tears on the eye. The slit-lamp graticule or slit height can be used to judge the height of the tear meniscus formed at the margin of the lower lid. A normal value would be around 0.4mm.

Keratometry

While keratometry values have no correlation to soft lens fitting performance, it is nevertheless important that these should be recorded, whatever the type of lens to be fitted. K-readings should be monitored on a regular basis throughout the aftercare. They should be compared to baseline values taken at the initial fitting. As well as the values, the clarity of the mires must also be recorded. This gives an indication of corneal clarity and is a sensitive monitor of early corneal distortion.

Non-invasive break-up time (NIBUT)/tear thinning time (TTT)

As well as its use in measuring corneal radius and assessing corneal contour, keratometry may also be used to measure tear film stability. The technique involves recording the time taken for the reflected mire image (the first catoptric image) to distort (TTT) and/or break up after a blink (NIBUT). Tolerant contact lens wearers average a NIBUT of around 20 seconds.

The advantages of this technique, as opposed to fluorescein, are its accuracy and repeatability. Instillation of fluorescein into the eye causes disruption of the lipid layer and, as well as stimulating reflex tearing, decreases the stability of the tear film.

Anterior segment examination

The slit-lamp examination is probably the most important procedure in both preassessment and aftercare of the contact lens wearer. It is sufficient to stress here that a full slit-lamp examination should be conducted and the results recorded in full. Use of a grading scheme will enable the practitioner to quantify the results and should be routinely used. Table 4 lists the main structures to be examined. The table also suggests how variations from the norm may be considered to help the practitioner identify the most suitable lens.

TABLE 4

Variations from the norm that need to be considered in the initial slit-lamp examination

STRUCTURE	VARIATION FROM THE NORM	MANAGEMENT OPTIONS
Eyelashes	Blepharitis	Resolve condition before fitting, be aware of atopic reactions
	Stye	Usually limiting – wait until cleared up
Eyelid margin	Meibomian gland dysfunction	Treat with hot compress before fitting
	Meibomian gland cyst	Refer for removal before fitting
Palpebral conjunctiva	Hyperaemia	Ascertain cause prior to fitting
	Follicle and/or papillae	Depending on severity – fit with RGP lens with intensive cleaning or soft one-day disposable or frequent replacement and nonpreserved care system
Bulbar conjunctiva	Hyperaemia	Ascertain cause prior to fitting
	Pinguecula/pterygium	Ensure minimum mechanical stimulus on area
Limbus	Vascularisation	Record for baseline, if physiological loops fit as normal – if neovascularisation fit higher Dk/t material and monitor closely
Cornea	Staining	Ascertain cause prior to fitting
	Opacities	Ascertain cause, record for baseline information
	Oedema	Fit high-Dk RGP lenses or high Dk/t silicone hydrogel lenses

Patient information

Once the decision as to the type of contact lens has been made, the practitioner must take responsibility for explaining the reasons. The discussion should include information on the benefits and risks of the particular wear modality and type of contact lens chosen, as well as advice on the likely ongoing maintenance costs, the importance of regular aftercare, emergency procedures and the need for patient self-monitoring. This is made easier by the use of a patient instruction book and acknowledgement form.

Summary

Contact lens aftercare begins with the preassessment of the prospective wearer. By considering patient requirements, motivation, history and symptoms, and the physiological state of the eye as parts of a jigsaw, the practitioner can compile a picture of the best management option for an individual patient. Time spent at this stage helps avoid unnecessary failures. Figure 4 is a flow chart, showing how objective and subjective findings are considered in turn to reach the final decision. ■

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REFERENCES

1. Jones L, Jones, D, Langley C and Houlford M. Reactive or proactive contact lens fitting – does it make a difference? *JBCLA,* 1996; 19: 2 41–43.

2. Morgan SL and Efron, NE The benefits of a proactive approach to contact lens fitting. *JBCLA,* 1996; 19: 3 97–101.

3. Efron, N. (2000) Efron Grading Scale for Contact Lens Complications. Millennium Edition, January 1, 2000. Biocompatibles – Hydron

4. Panting G. Cited in Euro Times, February, 2000.

5. Nilsson SEG Contact lenses and the work environment. In: Ruben M, Guillon M, eds. *Contact Lens Practice*. Chapman & Hall Medical, 1994; 917-930.

6. Ruston D, Meyler J. A new silicone hydrogel lens for contact lens-related dryness. Subjective clinical performance. *Optician*, 2005 October 7th.

7. Choo J, Vuu K, Bergenske P Burnham K Smythe, J, Caroline P. Bacterial populations on silicone hydrogel and hydrogel contact lenses after swimming in a chlorinated pool. *Optom & Vis Science*, 2005; 82:2 134-137.

8. Josephson JE and Caffery BC Contact lens considerations in surface and subsurface aqueous environments. *Optom & Vis Science,* 1991; 68:1 2–11.

9. Woods RL. The ageing eye and contact lenses – a review of ocular characteristics. *JBCLA,* 1991; 14:3 115–127.

10. Woods RL. The ageing eye and contact lenses – a review of visual performance. *JBCLA*, 1992; 15:1 31–43.

11. Nelson DM. and West L. Adapting to lenses: the personality of success and failure. *JBCLA*, 1987; 10:1 36–37.

12. Stapleton F. Contact lens–Related Microbial Keratitis: What can epidemiologic studies tell us? *Eye & Contact Lens,* 2003; 29(15): 585-589

13. Young G. Veys J. Pritchard N. Coleman S. A multi-centre study of lapsed contact lens wearers. *Opthal Phys Opt*, 2002; 22: 516-527.

14. McMonnies CW. Key questions in a dry eye history. *J Am Optom Assoc,* 2006; 57:7 512–517.

15. Begley Cet al. Use of the dry eye questionnaire to measure symptoms of ocular irritation in patients with aqueous tear deficient dry eye. Cornea. 2002; 21: 664-70

16. Hayes VY. Schnider CM. Veys J. An evaluation of 1-day dipsosable contact lens wear in a population of allergy sufferers. *Contact Lens & Anterior Eye,* 2003; 28: 85-93