

TODAY'S TRUTH ABOUT CONTACT LENSES – Dismissing the Myths

A set of Frequently Asked Questions for Eye Care Practitioners, GP's, & Paediatricians not directly involved in Contact Lens Practice.

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Introduction

The purpose of this paper, authored by the European Contact Lens Forum (ECLF), is to inform and update non-contact lens fitting and selling professionals on the latest developments in contact lenses. This paper is also intended to correctly inform these professionals in order that they can confidently inform and advise those interested in wearing contact lenses.

The European Contact Lens Forum (ECLF) is the exchange platform between **all contact lens specialists and the contact lens / lens care industry**. It consists of (in alphabetical order):

- **ECLSO** = European Contact Lens Society of **Ophthalmology**
- **ECOO** = European Council of **Optometry and Optics**
- **EFCLIN** = European Federation of **Contact Lens Industry**
- **EUROMCONTACT** = European Federation of National Associations and International **Manufacturers of Contact Lens and Lens Care Products**
- **IACLE** = International Association of **Contact Lens Educators**

Why have this information?

Technology, manufacturing and fitting of contact lenses (CLs) are constantly changing. Textbooks and educational materials often lag behind and therefore do not correctly represent the current situation. Non-contact lens fitting ECPs, General Practitioners (GPs) and Paediatricians are often asked about CLs and therefore should be familiar with the latest developments and have to know today's situation well enough to give proper advice.

With this paper the author (the European Contact Lens Forum (ECLF)) wants to update the knowledge of non CL fitting and selling professionals, so that they can confidentially and correctly inform and advise about Contact Lenses.

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Who can wear contact lenses?

Everyone can try lenses from children to the elderly. Whether they actually can wear them will depend on the state of their eyes, tears and the result of the actual fitting. These days almost all prescriptions can be made in some form of contact lens.

What types of contact lenses are available today?

The main lenses worn are soft lenses or with the newer material, silicone hydrogel. These days the maximum life is one year for soft lenses whilst many are used on planned replacement systems such as 3 or 6 monthly, but the vast majority are on disposable lenses which are monthly, bi-weekly, weekly or daily disposable.

Rigid gas permeable lenses (RGP) still exist and are thought to be visually superior to other materials, especially in more complicated spectacle prescriptions.

How is the contact lens market split up (market segments by lens types and replacement modalities, as well as wearing modalities)?

Within Europe, there are differences from country to country, but in general, soft contact lenses of various types dominate today's market (about 95%). Rigid gas permeable lenses play a minor, yet important role as some corrections can only or best be done with these lenses. In Europe, the monthly and the daily disposable lenses take the biggest share (similar share), followed by weekly and bi-weekly, then quarterly and yearly lenses. When it comes to wearing modality, less than 5% of the lens wearers sleep in their lenses on an every day basis. Many more (up to 30%), do so on an ad hoc basis, while the majority only use lenses during waking hours (which may for some be the night!). Another differentiator is the occasional, part time or full time use. Around 25% of the wearers use their lenses only occasionally (less than 1 to 2 times a week). About the same amount use them for 3 to 5 times a week (part time), while half of them use them almost every day (6 to 7 days a week-according to EUROMCONTACT and industry data).

How is each segment defined and what are the benefits and the downsides of each?

By replacement frequency:

Daily Disposables (DD), weekly (W), bi-weekly (BW), monthly (M), quarterly (Q) and yearly (Y). This is defined by the time between first use (first placement on the eye) and the final disposal of the lens, regardless of the actual amount of usage in between.

By wearing modality:

Daily wear, flexible wear, extended wear, continuous wear.

Daily wear (DW) is wear during waking hours only. Flexible wear (FW) is primarily daily wear with an irregular, occasional sleeping with the lenses. Extended wear (EW) is regular sleeping with the lenses with a maximum of 6 nights, followed by a night without lenses. Continuous wear (CW) is regular sleeping with lenses for up to 30 days or 30 nights (depending regulatory approval of the lens).

The benefits and disadvantages of each are (in short):

Replacement frequency:

Daily disposable lenses do not need any cleaning or care products. They are ideal for occasional wear. Each use means a clean, fresh lens. This makes them a modality with very low complications if used as recommended by the manufacturer. Daily disposables are the preferred option for sensitive eyes and allergic (solutions or seasonal) wearers. Convenience is high, however costs may be higher. When worn on an occasional or part time basis they are comparable in cost to weekly, biweekly and monthly lenses. They may cost more if worn on a full-time basis. However, one

has to add lens care cost to the pure lens costs of the weekly, biweekly, monthly and yearly lenses when making a comparison. Their lower cost per lens does not indicate an inferior quality. If the wearer compares each day, a constant high level of quality is essential for acceptance. It is the high volumes needed per wearer and per year (up to 730 lenses) and special production methods based on these volumes that allows for the low price per lens.

Weekly, biweekly and monthly lenses do not differ too much in their benefits. They usually come in more varieties than daily disposables and thus allow for an even better selection and fit. The downside is the need for care, which makes them less preferred than daily disposables for occasional wear. The larger amount of varieties does impact the production method and thus the cost per lens. Their much lower cost per lens than yearly lenses does not make it a disaster if a lens is lost or breaks whilst handling.

Quarterly, half-yearly and yearly lenses nowadays are only used when the needed parameters (size, shape, power etc) are not available in a disposable system. An increased usage comes with a higher risk of complications and requires more care. The production method makes them more costly. As they have to withstand a year's worth of handling they have to be made much thicker, which might mean they are less comfortable and will have less oxygen transmissibility. The latter can be overcome by using new silicone hydrogel materials.

All of the above is only valid when the lenses are used as recommended by the manufacturer.

From what age can one wear contact lenses?

Lenses can be worn from one week of age but these are cases where a baby has been born with cataract(s) that is/are removed to aid development in vision and when the child needs a constant prescription but will not wear their spectacles. This non-use of spectacles could mean impaired vision for the rest of their lives so contact lenses are a good treatment option. It could just mean they cannot function at school properly without an appliance (spectacles, contact lenses). In youngsters, the spectacle correction does change, even six monthly. With spectacles, this necessitates new ophthalmic lenses or even new spectacles as they are often lost or broken. With today's frequent replacement contact lenses, a quick check of the power can be done before every dispensing of the next supply (three or six monthly). RPG lenses are also ideal for children as they are considered to be a safer option in regard to the risk of infection. Having the best correction worn all the day has been shown to be beneficial with regards to the progression of the prescription. Also myopia (short-sight) may be controlled by wearing rigid lenses, but this is still a controversial concept. Studies also have shown a positive effect on better social integration of contact lens wearing versus spectacle wearing amongst children. Therefore, contact lenses are a useful choice.

Are all contact lenses the same when it comes to maintaining long term eye health?

All contact lens types can induce long-term changes to the eye tissue, especially if not monitored regularly nor worn and cared for as instructed by the Eye Care Professional and/or recommended by the manufacturer. These changes do not necessarily mean

having to stop lens wear. Much depends on oxygen needs of the particular eye - the oxygen supplied through the lens material, on the state of the tear film and many other factors all of which may produce problems whatever type of lens is worn. In general there are somewhat less problems reported with long-term wear of rigid gas permeable lenses but it seems that the newer, high oxygen transmissible silicone hydrogel materials and frequent replacement systems are also suitable for many years even decades of lens wear.

What is today's status on lens care?

Today's lens care is much simpler than it was in the past. There is no more boiling, or need to use many different solutions in a time consuming manner. Solutions available include all-in-one solutions a.k.a multipurpose solutions. Solutions can have a different level of compatibility with different lens materials. It is therefore important to use only the recommended solution. The latest generation of multipurpose solution is formulated to work well with all soft lenses, including silicone hydrogels. It is however, important to rub and rinse the lenses with these solutions.

Also available are modern one- step hydrogen peroxide systems, which are also compatible with all contact lens materials.

Solution use is also less time consuming than in the past as lenses are replaced before accumulating deposits which could have a health, comfort or vision impact. This shorter usage allows for less intensive care efforts or systems with less chemically loaded care solutions. But whatever solution system used it is important not to swop systems without asking the contact lens practitioner and to use the solutions as indicated and instructed.

The contact lens storage case is a source for lens contamination and consequent infections. Today's systems usually come with a new case per bottle.

Daily disposable lenses have broken the link of lenses and lens care, as these lenses do not require any care being simply discarded after use.

Is it important to rub and rinse soft lenses?

Yes it is. Some time ago the so called 'No Rub' care regimes were introduced into the market place. Today it is known that rubbing the lenses after use is a far more effective way of reducing contamination and accumulation of deposits.

Why is it advisable to keep to the recommended replacement schedules and not extend, if economically tempted?

All lens materials gradually deteriorate in their performance, both optically, in comfort (upon insertion, during the day and at the end of the day) and in oxygen transmissibility. This is primarily due to the accumulation of deposits on the surface and in the material of the lens, starting from the first time of wear. With some materials it happens faster than others, which have excellent features over a short wearing time, making them ideal as daily disposable lenses. The recommended replacement frequency is the result of clinical studies with many patients, reflecting the various wearing habits, tear film quantity and quality, care regimes as well as material characteristics in terms of ability to withstand handling and speed of surface degradation. The recommended replacement frequency is, therefore, a time period for which proper performance is assured for many users. However, for some users the eye care professional has to select shorter times to deliver equal comfort and vision during their use. Even in daily disposable use, the demand placed on the lenses can vary from day to day and thus so does the stress on the lens. Keeping lenses until they start to

feel dirty or make the eyes sore is not the best policy for years or decades of trouble-free lens wear. Keeping lenses until they are un-wearable starts various eye problems that will limit tolerance in the future. The reason for a replacement schedule such as monthly lenses is that lenses are disposed of before any surface problem can start. The beauty of daily disposables is to have a clean, fresh lens on the eye each time lenses are worn. This mode of wear is particularly important for infrequent wear.

Can you keep daily disposables longer than one day's wear?

The health and convenience advantages of daily disposable contact lens systems outweigh the economical implications of re-use. Daily Disposables are designed to be thrown away after one time of wearing (placement on and removal from the eye). If one would need to take them out during the day but wishes to wear lenses again later that day a second pair must be used. Keeping a case and lens care solution for these occasional uses is not a hygienically good idea and encourages infection.

Which is best for everyday users and what is most suitable for occasional users?

The best options for all day everyday use are either silicone hydrogel or rigid gas permeable lenses depending on the individual. Both of these lens types give enough oxygen to the eye. Occasional use is best done with soft or silicone hydrogel daily disposable lenses as they can be worn and thrown away without storage or cleaning. Each choice of lens type will depend on lifestyle factors as wearers have different needs for different occasions e.g. sport or social etc.

Can soft contact lenses be used for correction of astigmatism?

Yes, there are many soft lens designs that correct even high degrees of astigmatism. The higher the value the more likely the need for a conventional lens design, but even monthly disposables can deal with up to -5.75D. Today even daily disposable lenses exist that can deal with up to -2.00D of astigmatism. Nowadays, astigmatism is not a problem with soft lenses and never has been with rigid gas permeable lenses.

Can presbyopes wear contact lenses?

Yes! They can use monovision, bifocals or multifocals. These lenses come in rigid, soft and silicone hydrogel materials and many different designs. The most common forms work on a concentric concept (centre outwards), rather than top downwards, as one finds in bi or vari-focal spectacle lenses.

Can one really sleep in contact lenses?

Safer extended wear is possible with many of the silicone hydrogel materials compared to traditional soft materials due to the increased oxygen. They are worn in cycles of either six nights on and one night off or one time thirty nights on and one night off, depending on the lens material. This makes them a great reversible alternative to refractive surgery. Whilst not everybody wants to sleep in lenses, many professionals (fire fighters, nurses, and extreme sports people) or plain convenience seekers already benefit from this option. However, it must be remembered that all extended wear is associated with an increased risk of complications. Besides sleeping over night, many wearers do nap in their lenses. This increases the risk, if not done with the above mentioned silicone hydrogel or an appropriate rigid gas permeable material.

Overnight wear of rigid lenses is also possible and is the mode of wear for orthokeratology (moulding the shape of the cornea to eliminate mild to moderate myopia).

Why do all lenses need a proper fitting process?

Different lens materials and designs perform differently, even on the same eye. This is true also for soft lenses, although more so for rigid gas permeable lenses. Each wearer has different needs and expectations. If lenses do not fit properly, they will cause unwanted ocular changes which could be permanent. Set criteria for judging the fit of any type of lens need to be adhered to for safe, comfortable wear. This is why lenses of a different design from a different company will not behave on the eye in the same manner as another company's design or material, even if the parameters on the packaging are identical.

What happens at the fitting appointment?

For a fitting to commence, the practitioner needs an up-to-date spectacle prescription, a measurement of the curvature of the cornea and to have carried out an examination of the anterior ocular surface to make sure the tissue is able to accept lens wear. Questions would be asked as to the wearer's expectations, needs and wants, as well as occupation and general health. All of the above translate into specific technical requirements for the lenses (material, geometry, design, replacement frequency, lens care solution selection, wearing modality etc.).

If there were no contra-indications the fitting would commence having discussed the best type of lens necessary and the reasons for this choice. Further measurements may be taken and then an initial trial lens of the chosen type will be applied to the eyes. The fitting (movement, centration, comfort) would be assessed and the vision measured. Often two different designs are used on one or two eyes to help decide which is better for that person. Once satisfactorily fitting lenses are determined, the lenses would be ordered or issued from available stock. No lenses are issued without the wearer must first learn how to insert and remove the lenses from the eye. If a care regime is appropriate (not necessary for daily disposables) the procedures to be followed for cleaning and storage will be explained. Instructions on hygienic behaviour and 'what to do if' are also given. A schedule for the necessary follow-up visits is also agreed upon.

Why do lenses need regular follow-up (after-care-visit)? What happens during such an after-care visit?

As aging as well as contact lens wear of any type can give rise to changes to the ocular tissue, some of which may be without symptoms, it is important that the patient attends follow-up visits on a regular basis. These aftercare visits should go on as long as lenses are worn. The usual timeframe is either every six months or yearly, but can be sometimes shorter, such as 3 monthly.

The visit starts with a discussion of history since the last visit and any current symptoms. The wearing time is noted as is the care regime and how it is used. General health should also be mentioned. Vision and any over-refraction for distance and near are undertaken. The fitting is examined and the lens surface inspected. The lenses are removed and the ocular health is carefully investigated. Keratometry is re-measured as appropriate and an eye examination undertaken if advisable. Advice is given on anything worth discussing and, if needed, a change to a better performing contact lens may be proposed and a re-fitting undertaken. If not, the next supply of soft lenses is ordered or dispensed whilst a new pair of rigid lenses may be ordered as appropriate.

Is there a limitation on wearing time?

Generally, there is no limitation today. Some ten to twenty years ago, contact lenses were not as performing as they are today (oxygen supply, comfort, surface cleanliness, vision ...). In those days, it was prudent to not over use or over wear lenses, i.e. take a day off in the week, or not wear all day. Today, the wearer has the choice to wear lenses all day (including the first day) and as often in the week as desired. It is, however, a good idea to make the eye care professional aware of any changes in the wearing habits at the after-care-visit as the lenses need to match lifestyle. One of the only limitations the wearer may experience is increasing discomfort towards the end of the day or usage period. In such cases, re-fitting with a better performing lens material or design may help. This can be done during the after-care-visits. In general patients do not need to build up their wearing time and they may also not need a day off per week with modern materials.

Should contact lens wear be based on cost?

No. When comparing lenses one should not concentrate on the lens cost but on the professional fees for fitting and care.

What should be said to a patient keen to purchase lenses and solutions over the internet?

In principle, this should not cause any problem, as long as the lenses have been properly selected and fitted and only the exact lens brand and lens parameters that were prescribed are ordered, and does not change to a lower price offered for another brand. Also, it is only safe if one adheres to the follow-up / after-care-visit schedule and has the fit verified and confirmed regularly. In order to ensure this, some websites, especially in the UK and the US require the presentation of a written (fax, scan), valid (not expired) prescription/specification issued by an Eye Care Professional. According to their law (UK, US) they will verify the submitted prescription with the issuer.

There are some additional things that should be considered. Counterfeit contact lenses and care products are likely to be sold on the internet which is unlikely from a registered optical practice. It is impossible to ask any questions and get any advice from internet suppliers. If the shipment is not what was ordered, it is more difficult to reverse the order. Some websites may not send the actual brand resulting in an increase of counterfeit sales, or some may not send any lenses after payment. Many Eye Care Professionals will ship lenses and solutions with the same or even better convenience to their customers who have signed up for an annual system with easy to budget monthly payments as long as the after-care is adhered to (included in the scheme). This may be the better option if a created fee structure that is attractive to patients by charging an appropriate professional fee and setting the appliance at a cost-effective rate is offered.

Can the individual alternate between spectacles and contact lens wear?

Yes, this can be done every day and even during the day (in most cases).

Can an eye examination be carried out immediately upon removal of RGP lenses?

Yes. If the material and lens fitting is correct for the eyes then an eye examination undertaken about 5 minutes after lens removal should give a good end-point. If it does not, the wearer needs a contact lens after care visit. Being cautious the eye

examination can always be done in the morning after only a short wear of the lenses. As most people may use their spectacles in the evening the longer wearing time of the lenses is more useful to determine if the refractive result is as expected.

This does not apply to soft contact lenses, when an immediate eye examination can be performed.

What needs to be known about coloured contact lenses?

Coloured and fantasy contact lenses are used to change the eye appearance. It is important to realise that young people swop these lenses. The risks of doing this must be made clear to them and their parents.

Wearers of plano coloured contact lenses must understand that they are wearing a medical device. As the contact lens is the important factor in this cosmetic appliance, the care given to wearers of plano coloured lenses must be the same as to wearers of spectacles and contact lenses.

What are the known risk factors of inflammations and infections?

The two major risk factors of inflammation and infection are:

- overnight wear of lenses (even sporadic and regardless of their oxygen permeability)
- poor contact lens compliance and lens case hygiene.

Contact lens associated corneal inflammatory events are usually considered mild or non severe and some of them are even asymptomatic. Most of these events can be treated by temporarily discontinuing contact lens wear, while some cases require medical treatment.

Microbial Keratitis (MK) is among the rare, yet severe infections of the cornea and is a sight threatening condition.

Proper lens fitting, lens care solution selection, wearer instruction, after-care, wearer compliance and hygiene all contribute to lower any risk of having an infection or its severity.

Stop wearing lenses upon the first symptoms and consulting the Eye Care Professional is also important in preventing rare negative outcomes, such as loss of two or more lines of vision.

Daily wear of contact lenses has a lower risk for adverse events than extended or continuous wear lenses.^{1,2,3}

¹ Morgan et al, Incidence of keratitis of varying severity among contact lens wearers, Br. J. Ophthalmology 2005; 89: 430 – 436

² Stapleton et al, Ophthalmology, The Incidence of Contact Lens-Related Microbial Keratitis in Australia, 2008, Volume 115, Number 10, pages 1655-1662

³ Schein et al, Microbial Keratitis with Silicone Hydrogel Extended Wear Contact Lens Use, Ophthalmology (American Academy of Ophthalmology), Volume 112, Number 12, December 2005, pages 2172 - 2179

How can these risk factors best be addressed, reduced and controlled?

The best way to minimize the risk of eye infections is to avoid sleeping in the lenses and to follow proper lens care guidelines as prescribed by the eye care practitioner.

Among the key care guidelines contact lens wearers should follow are:

- Before handling contact lenses they must wash hands with soap and water, then rinse and dry with a lint-free towel.
- Minimize contact with water, including removing lenses before swimming or in a hot tub, keeping the eyes out of the water and wearing swimming goggles over the lenses.
- Read and carefully follow contact lens solution instructions.
- Contact lenses and storage cases should never be rinsed with or stored in tap or bottled water.
- During cleaning, the lenses should be rubbed, and then rinsed with solution before soaking.
- The contact lens case should be rinsed with fresh solution — not tap or bottled water. The empty case should be left open to air dry, if possible not in the bathroom.
- The contact lens case must be kept clean and replaced regularly, at least every three months. Lens cases can be a source of contamination and infection. Cracked or damaged lens cases must not be used.
- Used solution should be replaced and never “topped-up”.
- Contact lens solution should never be transferred into smaller (travel-size) containers. This can affect the sterility of the solution, which can lead to an eye infection.
- The tip of the solution bottle should never come in contact with any surface, and the bottle must be tightly closed when not in use.

Symptoms of Microbial Keratitis include pain, redness, sensitivity to light, sensation of something in the eye, excessive tearing or discharge. If a wearer has these symptoms, the lenses should immediately be removed. The wearer should contact their eye care professional as soon as possible if the symptoms do not go away. Early diagnosis is crucial for a successful medical treatment.

Contact lens wearers should be examined by an eye care professional at least annually. These regular exams are important to ensure overall eye health and a lifetime of successful contact lens wear.