

Presbyopia

A Guide for Optical Assistants

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Introduction

My arms aren't long enough!

How many times is this phrase used by a person telephoning or calling into a practice to enquire about an eye examination and spectacles?

Contact lenses are rarely even considered by patients as a solution to this change in their vision. **It is reassuring to patients if all staff are aware of the changes that can occur to vision over time, so that they feel confident they will be well looked after in the practice.**

This booklet specifically reviews the issues when discussing vision requirements in the over forties, when everyone begins to notice a change in near vision. A change in the ability of the eye to focus tightly at near is referred to as '**presbyopia**'

(prez-by-oh-pee-ah).



All about presbyopia

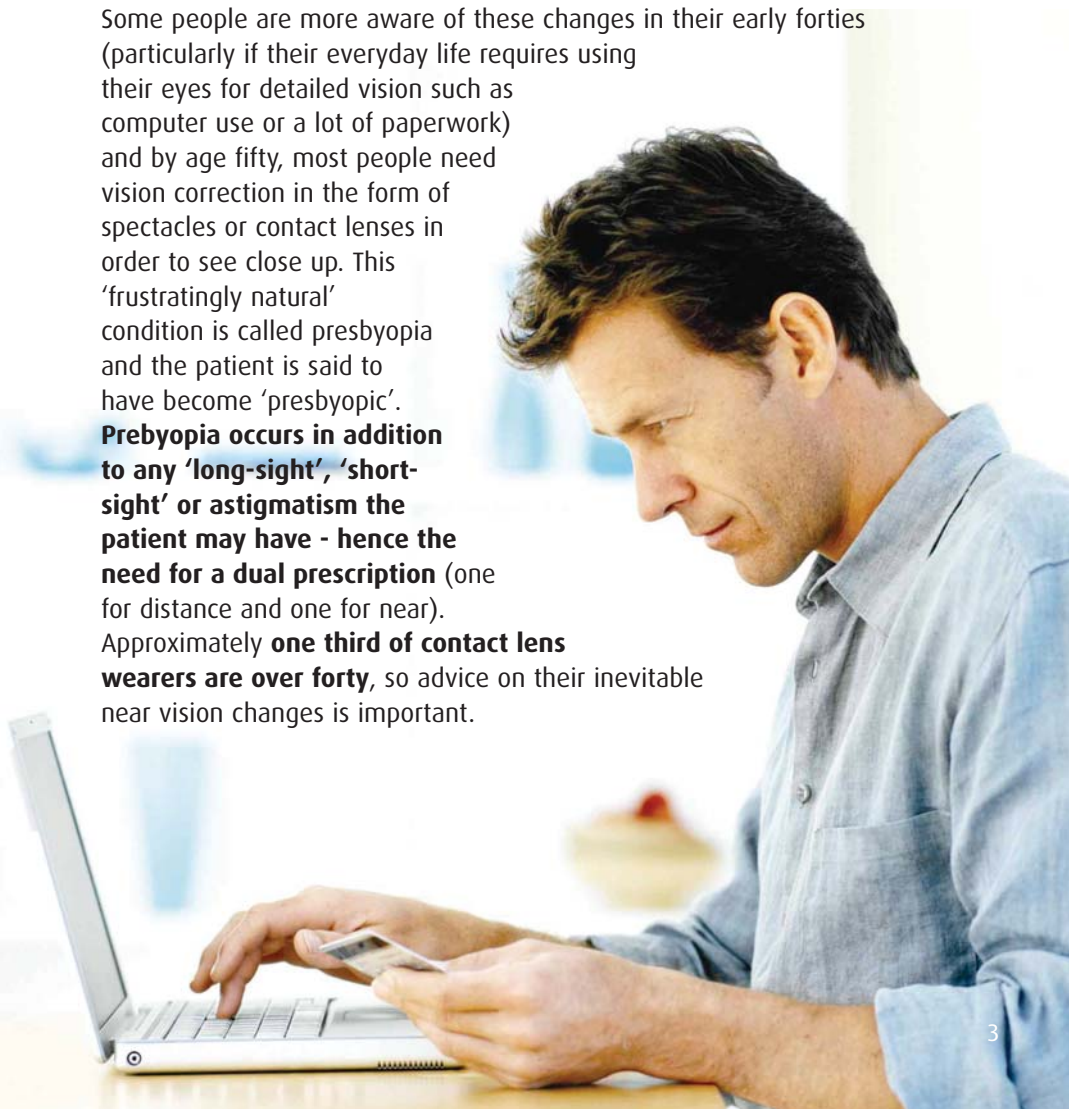
What changes?

Around age 40, symptoms of difficulty with focusing tightly close-up become apparent in everyone. Changes are noticed at this age due to an **inability to focus at close range**. This makes a person more aware of their vision when performing near tasks — such as reading the time on a wrist watch or texting on a mobile phone.

Some people are more aware of these changes in their early forties (particularly if their everyday life requires using their eyes for detailed vision such as computer use or a lot of paperwork) and by age fifty, most people need vision correction in the form of spectacles or contact lenses in order to see close up. This 'frustratingly natural' condition is called presbyopia and the patient is said to have become 'presbyopic'.

Presbyopia occurs in addition to any 'long-sight', 'short-sight' or astigmatism the patient may have - hence the need for a dual prescription (one for distance and one for near).

Approximately **one third of contact lens wearers are over forty**, so advice on their inevitable near vision changes is important.



How does it feel to be presbyopic?

To the person who has had trouble-free vision throughout their life before age 40, the onset of presbyopia can be a very worrying time. Suddenly they **experience blurred or variable vision** when trying to read up close, or perhaps they just **notice a delay in re-focusing**, for example when looking from text on the television to a newspaper and vice versa. This delay in focusing can be one of the first symptoms of presbyopia.

Many people complain that their **'arms are not long enough'** anymore. The reason they feel like this is simple. During the initial phase of presbyopia, they have a reasonable amount of focusing ability remaining. The near focus is manageable at arm's length, but becomes increasingly difficult the closer the object becomes. This constant readjustment to focus on things close up is sometimes referred to as the **'trombone' effect**. Great relief is often experienced when this is shown not to be an eye disease but an **unavoidable change in the eye related to 'increasing maturity'**.

No one wants to be reminded that they are ageing, so **careful words should be chosen when explaining this condition** to patients.



For the patient, the change can feel muscular, and frequently patients wrongly assume that their muscles are not working correctly, and if they rest their eyes, or even do without spectacles, the problem will go away. The reality is very different, and over time, their symptoms worsen until they cannot even read a newspaper without using spectacles. Focusing on anything at close range, whether that is someone's face or food on a dinner plate, requires good near vision, so some form of near vision correction is required in all everyday close-up situations.

Careful explanation must be given to patients who are presbyopic, because if they do not understand their progressively changing vision over time, they will live in fear that wearing spectacles will make or has made their eyes worse! **Patients need to know the physical changes within the eye, which cannot be prevented but can be overcome with the aid of spectacles and contact lenses.**

What causes presbyopia?

Inside the eye is a lens shaped rather like an apple seed. The **lens sits just behind the pupil** (the black middle of the eye). The **lens itself is very flexible at birth**, which means that the eye has a very wide range of focusing ability. This is one of the reasons why children are able to sit very close to the television without discomfort as well as colour with crayons with their noses almost touching the page.

Muscles are attached to the top and bottom of the lens, and when the eye is focused on something in the distance, the lens remains tall and slim. Once the eye focuses on anything close, the muscles allow the lens to change shape to become shorter and fat in the centre. **This change produces a shift in plus power to the eye** — almost as if the person has put on a pair of +3.00DS reading glasses. **The lens shape is adjusted to meet the demands of near focus — the nearer the focus, the more squashed the lens shape becomes.** This dynamic process of the lens changing shape is called ‘**accommodation**’.

Over time **the lens begins to harden and becomes less flexible**, which in turn directly impacts on the ability to focus close up. This is why spectacles must be used to provide additional help for near work. Contact lenses also provide a solution to this age-related change. When people have advanced presbyopia, which is around age 60, they lose all flexibility in their lens and they **can no longer accommodate or focus on near things without the aid of spectacles or contact lenses***. The eye loses its natural ability to change power for near, so near vision spectacles must be used in order to see clearly for any close work*. There are many everyday jobs requiring near focus — such as ironing, doing the washing up, cooking, shaving, applying make-up, using a cash machine — so **the presbyope has the need for near vision correction in many more places than simply reading a book or a newspaper.**





**If someone is short-sighted, e.g. their spectacle prescription is -2.00DS or higher, their natural eye 'power' means that they are able to focus close-up without spectacles — hence the term 'short-sightedness'. This can be advantageous in some ways, as such*

people may be able to read the mail in the mornings without the need for spectacles (unless their short-sightedness is so great that they have to hold the envelope 5 cm from their face!). Whilst this can be seen as a positive aspect to their near vision, distance vision is blurred without spectacles or contact lenses, so they require multifocal contact lenses or spectacles to get the most convenient all-round vision and to avoid the inconvenience of taking their spectacles on and off.

How is it tested?

During the course of an eye examination, the optometrist presents the patient with some small print held at the normal reading distance of the patient. Around age 45, it is usual to need a +1.00DS reading addition (that is +1.00DS on top of the lenses required for optimum distance vision) to focus comfortably. The optometrist shows the patient the difference with and without the lenses and the patient is able to judge very quickly if there is benefit to be had from having a near correction. In general, a shorter person will have shorter arms, so they will notice the need for correction sooner than someone who is 6'5" tall with a significantly longer reading distance. Women tend to report their symptoms sooner than men, with men only 'giving in' when their vision for near has significantly deteriorated. The table below details the approximate reading addition required for the different ages.

Age of patient	Reading Add
45	+1.00DS
47	+1.25DS
50	+1.50DS
52	+1.75DS
55	+2.00DS
57	+2.25DS
60+	+2.50DS

All about contact lenses



Statistics

Around **6% of the adult population in the UK wears contact lenses**. This means that discussions about contact lenses are likely to be a regular occurrence in optometric practice. **Disposable soft contact lenses** (replaced monthly or more frequently) **are the most popular in the UK** with over 90% of people being fitted with this type of lens.

Lens types

Soft contact lenses (SCLs)

SCLs are like microscopic sponges and are **very thin, flexible** and remain moist when on the eye. They are around 14.0 mm in size and cover the whole of the coloured part of the eye and slightly onto the white of the eye. On a blink they move about 0.3 mm and are the most popular lens choice in the UK. **Soft lenses are available in a wide variety of prescriptions**, including 'toric' lenses for astigmatism, coloured lenses to enhance or change the colour of the eye and multifocal contact lenses for people who are presbyopic and require a reading addition.

Rigid lenses (RGP — rigid gas permeable)

RGP lenses are made from various **types of plastic materials**, which vary in terms of their durability and how well the material allows oxygen to pass through. They are much smaller in size at around 9.5mm and cover about two-thirds of the coloured part of the eye. They move about 1-2 mm on a blink which can create some initial lens awareness. The **rigidity of the material** means that there is a 'wearing in' period — rather like a brand new pair of shoes — with most successful wearers achieving all-day wear in about two to four weeks. Virtually all prescriptions, including multifocals, can be made in RGP lenses, and very high prescriptions and some complex eye shapes benefit most from this type of lens.

Can presbyopes wear contact lenses?

Most people requiring a spectacle prescription can be fitted with contact lenses, and presbyopes are no exception. A full eye examination helps to determine the suitability of an individual. The types of lenses to choose from firstly depends on the spectacle prescription (**is a lens available for the prescription?**) and secondly depends on how the person wants to wear their contact lenses in terms of **hours per day** and the **number of days per week** (see section on oxygen).

General prescription suitability

Sphere

The sphere part of the prescription is an indicator of the availability of lenses, because not all lens types are available in all powers. For example, there are more people with minus prescriptions wearing contact lenses, so manufacturers concentrate their production of lenses in this power category with plus lens powers being either unavailable or manufactured only once a lens design is fully established in the market place.

Cyls and axes

It is **very important to look at the cyl in a spectacle prescription** when a patient is considering contact lenses. Patients who have cyls / astigmatism, commonly have an eye surface where, for example, from North to South the curve of the eye is steeper than from East to West where the curvature is more gentle. Contact lenses have the same curve in all directions across the lens, so fitting this eye shape can be more challenging and in extreme cases can be rather like trying to fit a flying saucer on a rocky mountain.

Once a spectacle cyl is 0.75 to 1.00 or higher, it is **corrected by using either a soft toric lens** (this is a soft lens with both a sphere power and a cyl power and axis) **or an RGP lens** (the small space between the back of the lens and the eye surface forms a 'tear' lens which corrects the cyl at the correct axis).

Presbyopes with a low cyl (up to 1.00D) can generally still be fitted in multifocal contact lenses. However, once their cyl is much higher, other means of vision correction will need to be offered.

About reading adds and contact lenses

For some people, the onset of presbyopia is the first time in their life that they have needed to rely on spectacles and it can be a very frustrating change. Having never needed vision correction can make someone very motivated to try contact lenses, and of course an already successful contact lens wearer who becomes presbyopic does not usually want the inconvenience of reverting back to spectacles or even needing to wear reading glasses over the top of distance contact lenses. **Most patients won't know that multifocal contact lenses can be the total solution for both near and far vision and the steps in between.**

A presbyopic patient requires a 'reading add' in the spectacle prescription. Even if the distance prescription is plano, with no correction necessary for clear distance vision, a prescription is required for near vision. Many people choose single vision reading spectacles as a solution, which focus only at near range. Single vision spectacles must be removed to see clearly into the distance. The removal of contact lenses to see in the distance is not practical, and this is why presbyopic patients, even with a plano distance correction, may be fitted with contact lenses to suit their multi-purpose requirements.



The presbyope has three contact lens options:

- **Multifocal contact lenses**
- **Monovision (one lens for distance and one lens for near)**
In the case of a patient who is plano for distance, this would mean wearing only one contact lens for near vision
- **Spectacles worn over distance contact lenses (half-eyes, single vision, bifocals or varifocals - multifocals would be made with a plano distance portion)**

Multifocal contact lenses

Multifocal contact lenses are manufactured in both soft and rigid gas permeable lenses, and the usual guidelines apply for which lens type is best. People are often fascinated to know how they work and what happens if they spin round and go upside down. There is a variety of designs of multifocal lenses, and they work by producing a clear

distance focus and a clear near focus on the retina, and some also provide intermediate vision. Fortunately, the brain is a brilliant vision processor and quickly adapts to the vision provided by these types of lenses.

The brain acts as a visual 'mixing desk' and chooses the correct focus from the contact lens depending on what the person is looking at. A short adaptation period is usually normal for this type of contact lens, which would also be expected with a bifocal or varifocal spectacle lens.

The technology used for multifocal contact lens manufacture has required huge research investments from the contact lens industry, and in many respects the prices of multifocal contact lenses compare favourably with a good quality pair of multifocal spectacles. In general, whenever a prescription can be made



into varifocal or bifocal spectacles, there is a possibility that multifocal contact lenses or monovision may be an option. The usual prescription suitability applies — astigmatism requires consideration with respect to lens type. With this in mind, there have been a few recent introductions to the market where a multifocal contact lens has a toric design incorporated to accommodate presbyopes with astigmatism (cyls over 0.75—1.00D).

Reading spectacles can be worn over the top of distance contact lenses in cases where multifocal contact lenses and monovision are not used.

Perhaps the most superb aspect of presbyopic contact lens correction is that **the contact lens travels wherever the eye looks**, so this type of vision correction is particularly helpful for people who have to focus at short distances above head height — such as a plumber lying down to work on pipes underneath a cupboard or even the simple daily task of reading labels on a shelf above eye level in a supermarket. Unlike varifocal spectacles where the user has to find the ‘sweet spot’ of focus and line this up with the area of interest, a contact lens moves with the eye and **good vision is experienced no matter where the eyes travel**.

Monovision contact lenses

Monovision is a system of contact lens fitting where one lens power is enhanced for reading vision. That is, one eye is corrected for distance vision and the other for near vision. Since it is the brain rather than the eyes that interprets what is seen, the brain learns to selectively see either the distance or near clear image with the contact lenses. Bifocal spectacles provide the wearer with clear distance and near vision at the same time. The bifocal spectacle wearer learns to concentrate through the top part of the lens to see an object far away and through the bottom half of the lens to see things close to. With monovision, a similar principle is at work, except turned sideways: the wearer sees better at near with one eye and better at far distances with the other eye.

Monovision can be used with all types of single vision contact lenses, as it is simply the enhancement of the power of one of the lenses that achieves the visual results.

Optimising lens wear

Scientific evidence has shown that the more frequently a soft lens is replaced, the better the lens will perform in terms of vision and comfort. This is also the case for RGP lenses, although their durability means that the optimum frequency of replacement is between 6 months to 12 months depending on the wearer.

The tears wash the lens on every blink, and tears contain oils (to lubricate the eye) and proteins (which defend the eye against bugs). All contact lenses become soiled by the tears and form 'deposits'. For this reason, **any lens that is re-worn must be carefully cleaned and disinfected** to keep the lens comfortable to wear, clear for vision and to reduce the number of bugs on the lens to minimise the risk of an eye infection.

Oxygen

The cells in the human body require oxygen to remain in a healthy condition, and the cells on the central surface of the eye, which make up the cornea (the clear layer in front of the iris and pupil) are no exception. The cornea is unusual in its anatomy in that it has no blood supply, so the **vital supply of oxygen to the cells in the cornea comes mainly from the air**. Many recent advances have been made in the oxygen breathability of lenses, in particular **silicone hydrogel soft lenses**.

Soft lens breathability

Prior to silicone hydrogel lenses, soft lenses were wholly dependent on the water within the material to transport oxygen through to the cornea. Soft lenses range from less than 40% (low water) to 40-60% (mid-water) to over 60% (high water) in their moisture contents. In short, oxygen from the air dissolves in the tears in front of



the contact lens, 'swims' through the water within the lens, emerges into a fine layer of tears behind the lens and then enters the first line of surface cells. **The more water there is in the lens, the easier it is for oxygen to move through to the eye.** The moisture held in soft lenses provides a 'liquid path' for oxygen from the atmosphere to move through and in turn reach the eye surface. The plastic from which a regular soft lens is made is not breathable, it is the fluid within the lens that promotes the breathability of the soft lens material.

Higher prescriptions require thicker contact lenses just as they do in spectacle lenses (minus contact lenses are thicker at the edge and plus lenses are thicker in the centre). For this reason, patients with prescriptions over 4.00D who require full-time wear may be offered lenses with higher oxygen performance for healthy lens wear. Clearly, if someone is to wear his or her contact lenses from waking to bedtime, the lens must perform so that sufficient oxygen reaches the eye surface (especially when the wearer does not give their eyes any lens-free time). The extreme scenario is in extended wear when the patient wears contact lenses continuously for up to one month. **Sleeping in contact lenses requires high performance lenses, and silicone hydrogel lenses for continuous wear have made this an option.**

Silicone hydrogel soft lenses

When silicone is added to the plastic of the soft lens material, this has a significant impact on oxygen transmission because oxygen is now able to move through the plastic of the lens in addition to any fluid in the lens. The water added to silicone hydrogel lenses serves to make the lens soft and flexible. In the UK, there are over six silicone hydrogel materials on the market and Bausch & Lomb is the first and only disposable silicone hydrogel multifocal lens on the market (PureVision Multi-Focal). Practitioners may choose to fit silicone hydrogel lenses as a daily wear option for their excellent oxygen performance.

Spectacles for all contact lens wearers

Many patients believe that their choice is either spectacles or contact lenses and not the marriage of the two. Successful contact lens wearers own a good quality pair of spectacles that they could wear in public if

necessary. However, most full-time contact lens wearers find the concept of wearing spectacles in public very alien, and when recommending spectacles to these patients they are reassured that being seen in public wearing them is not mandatory!

Occasional contact lens wear can be a positive benefit to the happy spectacle wearer, in that it provides them with a different 'look' when they get dressed up for a special event. Most presbyopes require their reading spectacles in order to read a menu in a restaurant where lighting is often more subdued and the small and sometimes faint print on some menus is even more difficult to read. The idea of being able to read without spectacles is very appealing and can motivate them to try contact lenses for such social occasions. **Contact lenses also serve as a spare form of vision correction** should they inadvertently break their 'three piece rimless' spectacles which require many days to be manufactured.





Dealing with enquiries

Many presbyopes are unaware of the option of contact lenses. Quite often the presbyope feels doomed to a life sentence of wearing spectacles, so being made aware of the choice of contact lenses can be very appealing. There is such a wide variety of contact lens types which allow for flexibility of wearing patterns — for example daily disposables as monovision and multifocal monthly disposables. The key factor with presbyopes choosing to wear contact lenses is knowing that these options exist and that someone in the practice offers them the opportunity to try.

***Sarah Morgan** is an optometrist, staff development consultant and emerging presbyope. At the University of Manchester she is involved in undergraduate teaching across all three years of the optometry programme. She has trained hundreds of staff in her tailored interactive seminars. Sarah is the author of two books 'Up front — a practice knowledge guide' and her new book 'The Complete Optometric Assistant' includes the everyday information staff require in addition to recommendations on how best to train and develop staff in the practice. She has recently performed at the Comedy Store in Manchester and was the winner of the NIVEA Funny Women Awards 2 Hour Challenge 2008.*

The Eye Care Professionals' view on PureVision Multi-Focal

It makes me more confident in offering multifocal technology to patients, as I feel I have a really effective tool for correcting presbyopia. It's a lens that will be comfortable on a slightly dry eye or used in conjunction with a VDU; a lens that can be safely slept in overnight if the patient forgets about them and maintains a good level of eye health; a lens that will overall improve the patient's quality of life, and, bottom line, it will improve your business profits.

Andrew Watson, Aaron Optometrists, Ashington

My hypermetropic patients love them as they can see to put on their eye makeup, use their mobile phone and see their wristwatch.

Susan R Bowers, Susan R Bowers Optometrists, Coventry

Very good. Best multifocal disposable contact lens on the market.

Claire Keith, Douglas Straine Opticians, Aberdeen

Excellent - best success rate of all multifocal lenses I've tried.

David Wilson, Dollond & Aitchison, Huddersfield

After using the lenses and seeing follow-up patients, I am impressed. First choice; better than monovision.

Jeanne Mendonsa Waas, Vision Express, Brent Cross

Great success and is pulling me away from monovision dependency.

David Harrison, SpecSavers, Kendal



Ordering and contacts

Local rate customer service number: **Tel: 0845 602 2350 Fax: 0845 602 2351**

Republic of Ireland direct order line: **Tel: 1800 409 077 Fax: 1800 409 083**

Online ordering: **www.bauschonline.co.uk**

Order by email at: **orderline@bausch.co.uk**

For more information visit: **www.bausch.co.uk**