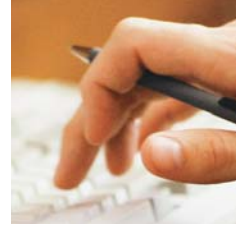




# Presbyopia case study

## Eye series - 20



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### Case history

A woman, 41 years of age, visits the office for a yearly eye check. She mentions that it is becoming difficult to focus for close work. By the afternoon her eyes feel particularly drawn and tired. She has several questions.

### Question 1

Are these symptoms normal?

### Question 2

What causes this condition?

### Question 3

Is this different from long sightedness or short sightedness?

### Question 4

Will glasses help?

### Question 5

Is it okay to use over-the-counter glasses?

### Question 6

Are there other options besides glasses?

### FEEDBACK

#### Answer 1

Yes. This condition is called presbyopia and occurs in most people in their early 40s. Patients will complain of difficulty in focussing on close material. To compensate, patients typically hold material further away. The effort to focus may lead to symptoms of eye strain (eg. tired, burning eyes) and headache after prolonged reading, which may be relieved by rest. Reading in good light may help. The presbyopic patient may also find it difficult to switch focus from close to distance objects and vice-versa. This may result in a short period of blur before the eyes adjust. After an initial decline, the eyes will generally stabilise for a period before the patient again notices a further reduction requiring the need for a revision or update in reading glasses. Distance vision should change little over time.

#### Answer 2

Presbyopia occurs due to a loss of accommodation. Accommodation is the process by which the eye increases its power to provide clear vision. This occurs when the ciliary muscle inside the eye contracts or relaxes to enable the natural lens to change to provide a clear image, particularly for objects up close. The loss of accommodation is thought to occur either by a loss of elasticity of the ciliary muscle or by a hardening or thickening of the lens. Accommodation will gradually decrease until approximately 60 years of age when no

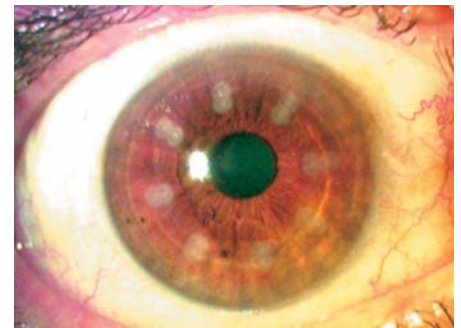


Figure 1. Eye immediately following CK procedure

further change in the lens or ciliary muscles is possible.

#### Answer 3

Long sightedness (hyperopia) is characterised by reasonable distance vision and poor vision at near range. Short sightedness (myopia) results in poor distance vision, however, the patient can usually see well up close. Both conditions occur due to the shape of the cornea or the length of the eye. Hyperopia and myopia may be caused by genetic factors, disease or trauma, and usually become apparent when the patient is younger. Although the presbyopic process may begin at a relatively early stage, the condition will generally not become manifest until the early to mid 40s when the eye has changed sufficiently for the patient to notice symptoms. Presbyopia can occur simultaneously with either myopia or hyperopia.

#### Answer 4

Glasses are the most common form of correction for presbyopia and essentially serve to magnify the letters compensating for the

lack of ability to focus on the print. Choosing the most suitable pair of glasses depends on a number of factors such as the patient's current prescription and occupation. A patient that is myopic will also require correction for distance vision, therefore bifocals – which provide correction for two different focal points – will be necessary. A patient who works with several near distances such as computer and desk work may require a transitional effect. Multifocals or progressive lenses will offer a more gradual transition between the two distances and provide greater flexibility. 'Readers' or half glasses focus at a single distance and are usually worn during close work. The strength of the glasses depends on the distance the patient generally feels comfortable holding objects at. Readers are most common with patients who have no distance refractive error as they allow the patient to see comfortably over the top.

**Answer 5**

Over-the-counter reading glasses are now commonly found in supermarkets, newsagencies and pharmacies. These glasses are a 'ready made' prescription and offer a cheap alternative to a custom prescription pair of glasses. The disadvantage of these glasses is that they are essentially 'one size fits all'. Most people do have a small amount of prescription, with one eye commonly being slightly different to the other. Similarly, facial anatomy is different for everyone. The optical centre (the point of optimum effectiveness of a pair of glasses) is often different for each individual. General glasses do not factor this, and it is possible that the differences are great enough to lead to eye strain and headache. Over-the-counter glasses also vary dramatically in the quality of the lenses and may serve to affect the vision. It is important to examine the glasses for any signs of defects such as distortion or bubbles in the lens surface. Perhaps the main problem with using these glasses is not due to the glasses themselves. People that purchase ready made glasses will often forgo a visit to their eye

specialist. Although these changes will commonly be part of the natural presbyopic process, it may also indicate a more serious problem with the health of the eye. Eye conditions such as glaucoma and cataracts can lead to subtle changes in the vision and if not treated adequately may lead to severe long term damage. Patients over 40 years of age should consult an optometrist or ophthalmologist at least every 2 years for a complete eye health examination.

**Answer 6**

Several options, apart from glasses, are currently available to help reduce the dependency on glasses for near work. The main method of compensating for these changes is to produce monovision. Most people have one eye that dominates for distance vision. This eye is used to line up objects such as images with a camera. By changing the focus of the nondominant eye for close work, the brain will then effectively switch between the two for both clear distance and near vision. This does represent a compromise and patients may note a small reduction in distance vision with both eyes open, however, the benefit is the ability to read most print without the need for glasses. Rarely will the difference between the two eyes cause significant symptoms. Monovision can be induced by contact lenses, however, surgical options offer a more permanent alternative:

- conductive keratoplasty – uses low level radiofrequency to steepen the cornea and bring focus forward for close work (Figure 1). The patient will notice some fluctuation in the vision and glare from strong light as the eye heals, however, this settles relatively quickly. No serious, sight threatening complications have been reported using this technology. Predominantly one eye only requires correction
- laser eye correction – the cornea is reshaped by laser rather than by radiofrequency. Patients should always consult a specialist for a complete eye examination to discuss their suitability. A monovision

trial should be undertaken (with either contact lenses or trial frames) before surgery to ensure the patient is comfortable and fully understands the suggested changes.

For older patients, or those with the beginnings of cataracts, replacing the lens of the eye with an artificial lens may help provide benefit for near work. Multifocal or accommodative intraocular lenses can help reduce the dependency on glasses. The main disadvantage of this procedure is that surgery is invasive and therefore open to complications such as infection. Studies have also shown that a small percentage of patients may notice permanent glare or haloes at night with these particular lenses. Recent technological advances have been aimed at reversing the presbyopic changes. These include the implantation of segments of bands within the eye that allow greater room for the muscles and lens to move, thereby increasing the ability to work. Trials have produced mixed results and safety concerns exist such as erosion of the implants over time, and changes to the circulation of the eye. Further study is required before these options can be considered.



Conflict of interest: none declared.

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**The 5 domains of general practice**



**1. Communication skills and the patient-doctor relationship**



**2. Applied professional knowledge and skills**



**3. Population health and the context of general practice**



**4. Professional and ethical role**



**5. Organisational and legal dimensions**