LEARNING DOMAINS

CLINICAL PRACTICE

PROFESSIONAL GROUPS

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The management of ptosis

By Cheryl Hill FBDO SMC (Tech) CertEd

Patients presenting with, or complaining of, droopy eyelids are commonly seen in practice – and it is important that the cause is determined, and the patient referred for treatment. Where surgery is not an option, patients should be managed in practice. This article looks first at the ocular anatomy involved and potential causes, before exploring how we can help to manage symptoms in practice. Whilst surgery is commonly used as a treatment, this article focuses more on non-surgical options for those who either cannot have, or who do not want, surgical intervention.

Whilst the focus of this article is the interruption of vision due to ptosis, the condition can also have a negative effect on the patient's quality of life[1] – and this should be considered when caring for those with ptosis. A study at Bristol Eye Hospital in 2014[2] looked at the psychological effects of ptosis. Patients reported that the condition left them looking tired; they also reported higher levels of anxiety, depression and concerns over their appearance.

After ptosis surgery, patients taking part in the study rated cosmetic appearance as the second most important outcome, after the improved level of vision. Therefore, given that ptosis props are not always the most cosmetically appealing appliance, and that the use of ptosis props may be a secondary choice for the patient, understanding these implications is important whilst managing patient expectations.

WHAT IS PTOSIS?

Blepharoptosis, commonly referred to as ptosis, is when the upper eyelid sits lower than its normal anatomical position in primary gaze. The term is derived from the Greek expression blepharon 'eyelid' and ptosis 'act of falling'[3]. The condition can be bilateral or unilateral and very much depends on the underlying condition, or reason for the ptosis. Congenital ptosis can be due to the late development of the levator muscle, which occurs around 16 weeks of foetal development[4]. Acquired ptosis is much more common and is the focus of this article.

PREVALENCE

There is little up-to-date research of any kind, which investigates the prevalence or nature of ptosis and its management. This highlights the importance of careful ptosis management within practice, as with an ever-ageing population this will be the kind of patient who will be seen more often. Most ptosis research and development is linked to surgical methods of intervention, with the use of ptosis props being very much marginalised.

In a 1995 study of 400 individuals aged ≥50 years old in the United Kingdom (UK), 11.5 per cent were determined to have ptosis. Of these, 39 per cent had bilateral ptosis and 61 per cent were unilateral. In all but four of the cases, the ptosis was acquired. Prevalence increased with age, with studies showing 42.9 per cent of those aged over 80 diagnosed with ptosis[5].

With the UK population in 2011 sitting at 63 million people, with 16.6 per cent aged over 65 years, and increasing to 67 million people, with 18.92 per cent aged over 65 in 2021, it can be seen how patient numbers will follow suit and increase[6].

ANATOMY

The levator palpebrae superioris is a striated muscle, which acts as a primary retractor for the upper eyelid. It originates in the upper apex of the orbit, where it is continuous via a tendon, with the superior rectus muscle. The levator is innervated by the superior division of the oculomotor (third cranial) nerve. Its blood supply is from the ophthalmic artery and venous drainage occurs via the superior ophthalmic vein.

The levator muscle, its aponeurosis and the superior tarsal muscle are responsible for upper eyelid resting position and elevation[7]. Ptosis occurs when any – or all – of these structures are paralysed or paretic (**Figure 1**).

CAUSES

There are said to be five main causes of acquired ptosis[8,9].

APONEUROTIC PTOSIS

The ageing process of the aponeurosis is the main cause of mild to moderate ptosis in elderly patients. Gravity takes its toll and loss of tone in the levator muscle and the aponeurosis cause it to stretch. It can be worsened by chronic inflammation, surgeries such as intraocular lens insertion, prolonged rigid gas permeable (RGP) contact lens wear, and trauma.

MYOGENIC PTOSIS

In myogenic ptosis, the dysfunction of the levator can prohibit the upper lid from being fully elevated. Some common conditions are myasthenia gravis, myotonic dysfunction, and facio-scalpulo-humeral muscular dystrophy amongst others. As these are generally degenerative diseases, a conservative approach to lid elevation is considered to avoid exposure keratitis. One option is to also elevate the lower lid during surgical intervention.

In the case of myasthenia gravis, this can cause the ptosis to vary in size both throughout the day and over the course of a few days. This should be borne in mind when considering any kind of surgical correction – and stability should only be measured once pharmacological stability is achieved.

NEUROGENIC PTOSIS

Any form of damage to the oculomotor or sympathetic nervous system can result in an acquired ptosis. Intercranial aneurysms can lead to a pathology such as subarachnoid haemorrhage. Meningitis can cause increased pressure, and lesions within the system can all damage the third cranial nerve. This can therefore lead to neurogenic ptosis.

Once a cause for the nerve damage has been established, a period of recovery should be observed to allow any natural repair of the muscle function to occur. In the case of Horner's syndrome, Muller's muscle only gives a small raise to lid height which is why cases such as these generally only present with mild ptosis. Neurogenic ptosis can be caused indirectly by systemic conditions such as diabetes, or chronic auto immune illnesses such as multiple sclerosis.

MECHANICAL PTOSIS

Mechanical ptosis is brought about by conditions such as blepharochalasis, where the patient suffers with episodic excessive swelling of the eyelid, generally bilaterally. It can also be found when tumours of the eyelid are left untreated and the weight of this excess tissue of the lid causes the lid to drop. Generally, removal of the excess tissue will alleviate the problem and should be carried out before consideration of further ptosis surgery.

TRAUMATIC PTOSIS

This type of ptosis can occur due to direct or indirect trauma to the levator muscle. If a patient receives a penetrating injury to the levator muscle, it needs to be repaired immediately. However, a blunter force injury would need to be allowed time to recover before a treatment plan was made – as it can self-rectify.

Depending on the root cause of the ptosis, some cases will resolve themselves whereas others will need medical intervention – such as a management plan for the systemic disease which has caused it.

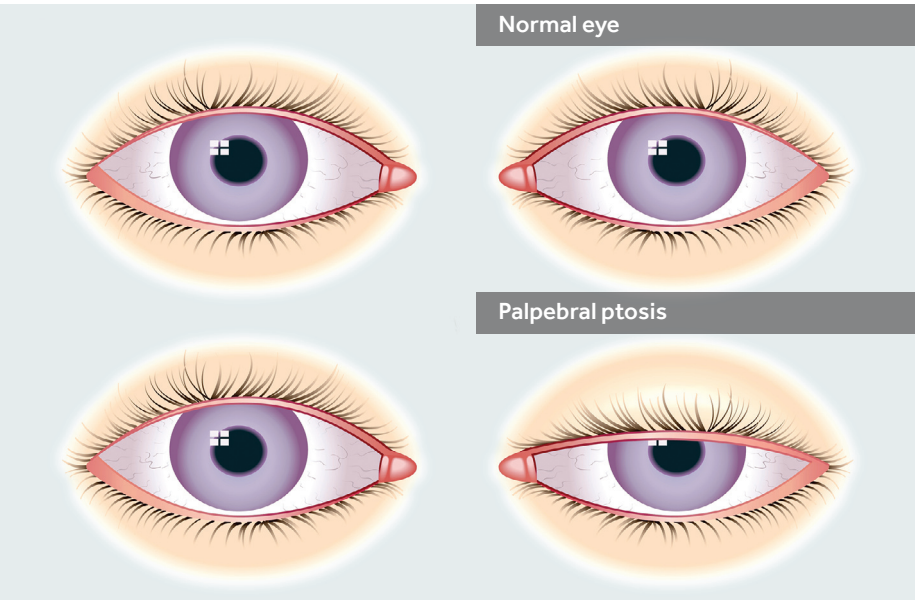

FIGURE 1: Ptosis *(courtesy of istockphoto.com)*

DIFFERENT PRESENTATIONS OF ACQUIRED PTOSIS

Acquired ptosis can present in many different forms. It may be monocular or binocular, it may be progressive, fluctuating or may not change at all. This information is important in a case history along with information on any neurological or ophthalmic symptoms we may need to consider.

If the patient has suffered an acute or recent onset of ptosis, serious pathologic aetiology needs to be investigated before any management options are discussed. If a patient is unsure of how long-standing their symptom has been, looking over old photographs can help to confirm changes over time.

HOW TO MEASURE PTOSIS

In order to monitor ptosis and its effect on patients, it is useful to understand how ptosis is measured, so that changes over time can be documented. **Figure 2** shows how this simple process can be done.

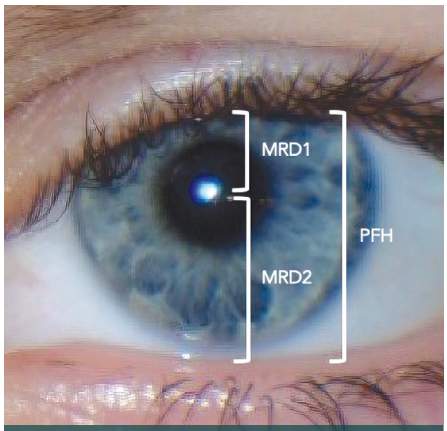

FIGURE 2: Eyelid measurement
(courtesy of Squarespace)

The palpebral fissure refers to the normal exposed area between the upper and lower lid margins. The palpebral fissure vertical height (PFH) is measured from the lower lid to the upper lid and its average measurement is 8-11mm[9].

The other measurement then used to determine the severity of the ptosis is the margin to reflex distance (MRD). As the name suggests, this is the distance from the lid margin to the corneal reflex point. It is measured by asking the patient to fixate on a light source and then measuring from the upper lid margin to the reflex (MRD1) and then from the lower lid margin to the reflex (MRD2).

A normal MRD1 is 4-5mm[9]. These two measurements should add together to equal the PFH. The difference from the average PFH found in mm when measuring a ptotic eye is the amount of ptosis[10]. **Table 1** shows ptosis severity based on difference from average PFH value.

PTOSIS SEVERITY	
MILD	1 - 2 mm
MODERATE	3 - 4 mm
SEVERE	> 4 mm

TABLE 1: Ptosis severity based on difference from average PFH value

MANAGEMENT OPTIONS

Sometimes, the dispensing optician may be directly involved in the management of ptosis if they are to fit a ptosis prop to spectacles. However, they also have a duty to refer a patient where required[11]. They also must understand the alternative management options to be able to support the patient.

SURGICAL OPTIONS

When deciding on the best surgical approach, consideration must be given to the remaining levator function alongside the amount of ptosis to be corrected and the causes of the ptosis itself.

In a levator aponeurosis advancement, the aponeurosis is tightened or reattached to the tarsal plate. This, however, means that the patient needs a good level of levator function for this to be successful. A method known as the Fasanella-Servat Mullerectomy[12] is a good alternative method for patients who present with good levator function.

For those patients with poor levator function, a procedure known as a frontalis sling[13] – which suspends the upper eyelid from the frontalis muscle of the forehead – can be suitable.

SPECTACLE OPTIONS

For those who do not wish to have surgery, or for those whom surgery is not an option, then a prosthetic device such as a spectacle frame adapted with a ptosis prop or crutch can be an ideal solution. There are now a variety of such devices available to any practitioner who wishes to become involved in this aspect of dispensing and ptosis management.

The Lundie loop (**Figure 3**) and the half lundi loop (**Figure 4**) provide an excellent amount of both resistance to the lid falling, but also stability to allow full blink. The metal loop, originally designed by Mr Lundie, is generally metal and covered in a hypoallergenic tubing.

The nylon loop (**Figure 5**) is a simple design and can be made in practice with sufficient practise and the correct tools. The nylon cord is passed through two holes, which have been carefully drilled into the frame (usually acetate) and then tied off/burnished to the correct length to support the upper lid. Once the correct length is ascertained then it can be glued, or UV set, into place. Due to its design and flexibility, is it a great option for those who need a little more impact resistance from spectacles.

A spring bar (**Figure 6**) is permanently fixed to the temporal side of the frame and allows easy use for the wearer when fitting. Some suppliers will also 3D print a version of the spring bar giving the added benefit that it can be easily removed by the patient when not needed and fitted correctly again when required.

When deciding which type of device to fit, some thought needs to be had about the patient and the cause of the ptosis itself. When thinking about the patient, ask yourself:

- How is their general health?
- Do they have the dexterity to be able to deal with such a device?
- Can they monitor the fit for a safe wearing schedule?

When thinking about the device, the type of ptosis needs be considered in how flexible the device needs to be to allow the corrected eye to fully blink and reduce further potential complications. When ordering these devices, measurements will need to be supplied to allow the manufacturer to correctly fit the device to the frame chosen.

- ***Horizontal distance*** from the back surface of the spectacle frame to the position on the brow/lid aperture should be supplied for the side of the frame that the device is to be fitted to.
- ***Vertical distance*** from the top of the frame to the brow/lid position should also be supplied; a minimum depth of 3mm is recommended.
- ***Pupil distance*** is also required, especially for the purpose of centration for the Lundie loops.

Different manufacturers have given recommendations on frame styles and materials which can be used, and so some research into a company who provides exactly what you are looking for will be needed. Some manufacturers prefer to work with metal frames, some with acetates though some will also fit devices such as nylon loops to rimless mounts by drilling into the Trivex lens.

FIGURE 3: Full Lundie loop

FIGURE 4: Half Lundie loop

FIGURE 5: Nylon bar

FIGURE 6: Spring bar

(Figures 3-6 courtesy of Spec-Care)

CONTACT LENS OPTIONS

Contact lenses can be both the cause and a treatment option for ptosis. It has been shown that a hard contact lens wearer has 20 times the increased risk of ptosis[14]. This could be due to the removal technique used for hard lenses, the repeated antagonistic action of the orbicularis and levator and the same time squeezing the lids to pop the lens out. This form of ptosis usually takes around six weeks to develop and can be noticed by the patient – particularly in advanced cases[15].

Different causes of contact lens induced ptosis (CLIP) can be assessed and then treated in different ways. The repeated stretching of the upper lid to remove the RGP contact lens can cause some dysfunction of the aponeurosis, as can the dislodgement of the tarsus. Non-aponeurogenic causes of CLIP can include blepharospasm and papillary conjunctivitis. To decide which is the likely cause, refrain from contact lens wear for four to six weeks to see if partial, or the potential for full, recovery occurs.

A lid eversion check should also be carried out to check for papillary conjunctivitis. Again, refraining from contact lens wear should see an improvement in the condition[15]. If improvement is found by simply removing the lenses, it would be considered good practice to change to soft contact lenses, which are not known to cause ptosis

If no improvement is found, the cause is likely to be damage to the aponeurosis and a referral for surgical options should be discussed. However, contact lenses can also be successfully used to alleviate the symptoms of ptosis where surgery is not an option[16].

Scleral contact lenses can be used, and different methods have been found to successfully keep the upper lid at a higher position – increasing the palpebral fissure height. A 'shelf' can be incorporated into the front surface of the lens on which the upper lid will sit upon. Alternatively, a ledge can be added onto the front surface of the lens to create the same effect – but means a thinner overall lens can be fitted which will improve the oxygen transmissibility.

In cases of very mild ptosis, simply the introduction of a scleral contact lens can lift the upper eyelid due to the thickness of the lens. Caution and monitoring

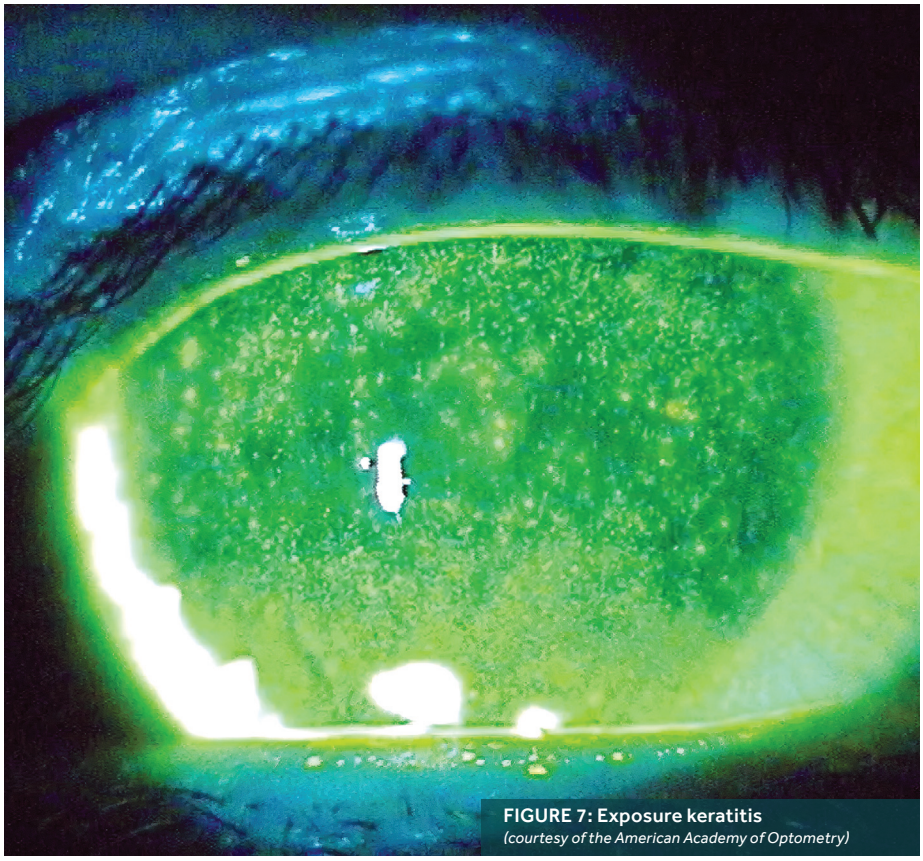

FIGURE 7: Exposure keratitis
(courtesy of the American Academy of Optometry)

should be taken if using this method, however, as the increased thickness of the lens will reduce oxygen transmissibility of the lens[13]. As modern-day scleral contact lenses are generally made of gas permeable materials, this is not as much of a concern as it might once have been.

COMPLICATIONS

Ptosis surgery, as with any surgery, can come with risks. These risks may involve under or over correction or distortion of the lid margin, which can affect tear effectiveness.

If a ptosis prop has been fitted to a spectacle frame, the main concern should be the risk of damage to the eye. A prop that is overly restrictive of the movement of the upper eyelid can cause incomplete or inadequate lid closure, which in turn can lead to exposure keratitis (**Figure 7**).

When the ocular surface does not receive enough lubrication due to inadequate lid closure, exposure keratitis can begin – and if left untreated can progress to corneal ulcers and become a sight-threatening condition. Patients will generally report symptoms of dry eye (mild pain, foreign body sensations, epiphoria, photophobia, decreased vision, etc) but a thorough examination of the anterior eye and the adnexa will reveal corneal exposure as being the underlying aetiology.

Whilst there are many and varied causes for this condition, in a patient where we knowingly restrict the movement of the upper lid, and therefore the ability to perform full and complete blinks, frequent aftercare appointments need to be booked to monitor the fitting and use of the device, alongside counselling of the patient as to the symptoms to be aware of.

If we have fitted the patient with a scleral contact lens ptosis prop, then exposure keratitis is less of a concern due to the large diameter of the lens, which will provide coverage of the cornea and act as a bandage[17].

SUMMARY

Dispensing opticians and contact lens opticians are very well placed within High Street practice to deal with ptosis patients who either cannot, or do not wish to, proceed with surgical options. As we are an ageing population, the prevalence of ptosis is set to increase. It is within a dispensing optician and contact lens optician's scope of practice to help take care of these patients.

CHERYL HILL qualified from ABDO College and registered as a dispensing optician (DO) in 2006. Cheryl has worked in both independent and multiple optical practice at management level. She previously lectured in ophthalmic dispensing at Bradford College before moving to currently lecture in ophthalmic lenses and dispensing at the University of Bradford, School of Optometry and Vision Science. Cheryl also works part-time for ABDO CPD, developing professional education for DOs and optometrists. She is a member of the Advisory Panel for All About Vision UK, and a UK and overseas practical and theory examiner for ABDO. Cheryl is an experienced face-to-face and online presenter and facilitator of CPD, for both optometrists and DOs.

LEARNING OUTCOMES FOR THIS CPD ARTICLE

DOMAIN: Clinical Practice

5.3: *Be aware of good practice approaches to the management of ptosis, and consider how you may apply this to your clinical practice.*

6.1 & 6.2: *Work within the limits of your personal and professional scope of practice when providing care for patients with ptosis, and identify when it is necessary to appropriately refer your patient in the interest of their health and safety.*

7.1: *Conduct an adequate assessment when providing care for patients with ptosis.*

CLINICAL PRACTICE

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