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The eyelids and the orbit

Key signs for differential diagnosis and management

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Module 9 Part 1 Differential Diagnosis of Ocular Disease

Course code: c-2686

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Following additions to the optometrist's therapeutic armamentarium, it is imperative that the practitioner is able to formulate an appropriate differential diagnosis when encountering patients with ophthalmic maladies. Although it is beyond the scope of this article to provide a definitive list of all ophthalmic manifestations pertaining to a particular structure, it is hoped that it will act as a trustworthy reference for those conditions likely to be encountered in everyday practice.

Orbit

Anatomy

Essentially, the orbit can be compartmentalised into five structures – namely the roof (lesser wing of sphenoid and orbital plate of the frontal bone), the floor (zygomatic, maxillary and palatine bones), the lateral (greater wing of sphenoid and zygomatic bones) and medial (maxillary, lacrimal, ethmoid and sphenoid bones) walls and, finally, the superior orbital fissure. The latter structure is, in essence, a hiatus between the lesser and greater wings of sphenoid through which numerous important structures pass. The fissure is further divided into a superior and inferior portion. Whilst the oculomotor, abducens, nasociliary and sympathetic fibres pass through the former, the superior orbital vein, frontal, trochlear and lacrimal nerves penetrate through the latter.

Relevance of anatomy

Since the roof of the orbit is subjacent to the anterior cranial fossa, defects confined to this area may result in a pulsatile proptosis due to the resultant transmission of cerebrospinal fluid (CSF).

»» Table 1

Signs of orbital disease

Structure	Signs
Soft tissue	Chemosis Ptosis Eyelid retraction
Globe malposition	Proptosis Enophthalmos Dystopia
Ophthalmoplegia	Restrictive myopathy Nerve palsy Muscle entrapment secondary to a fracture
Posterior segment	Optic nerve swelling/atrophy Choroidal folds Vascular congestion

Patients harbouring an ethmoidal sinusitis are vulnerable to acquiring a secondary orbital cellulitis due to the fact that the medial wall (which lies adjacent to the ethmoidal sinus) is lined by a flimsy membrane replete with foramina for both blood vessels and nerves.

As a result of the assorted nerves and vasculature associated with the superior orbital fissure, inflammation of the same said structure may result in a plethora of signs and symptoms. The two most noteworthy signs and/or symptoms include proptosis (see later) secondary to the increase in hydrostatic pressure associated with venous obstruction and diplopia secondary to the ophthalmoplegia through the involvement of the relevant cranial nerves.

Signs and symptoms of orbital disease

Table 1 illustrates the signs observed in patients harbouring orbital disease.

Proptosis

Proptosis implies anterior displacement of the globe. Although exophthalmos and proptosis may be used interchangeably, the former description is preferred by some

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» **Figure 1**
Axial proptosis and eyelid retraction
(by courtesy of Raman Malhotra)

physicians to imply protrusion of the globe secondary to thyroid eye disease. Before such a diagnosis is made, it remains incumbent on the clinician to exclude causes of pseudoproptosis such as an enlarged ipsilateral eye (for example, high myopia), ipsilateral eyelid retraction or contralateral enophthalmos.

Although exophthalmometry remains the gold standard of measuring the degree of proptosis in ophthalmology clinics, such a technique is seldom employed in the optometric setting. An alternative approach is to measure from the lateral orbital ridge to the corneal apex with a transparent rule. A protrusion of greater than 20mm is diagnostic of proptosis. Notwithstanding, a difference of 2mm irrespective of the greater reading may warrant further investigation.

In addition to measuring the degree of proptosis, three further properties which are important to document in order to elucidate the possible aetiology are: the direction; whether the proptosis is unilateral or bilateral; and whether or not the proptotic globe/s possess any dynamism.

Proptotic eyes which are axial in nature (**Figure 1**) are usually associated with lesions confined to the muscle cone such as optic nerve tumours. Extraconal lesions, by contrast, have a tendency to produce eyes which are both anteriorly and eccentrically displaced. Moreover, the direction of the proptosis is opposite to the side of the lesion. Thus, an eye which is displaced inferiorly and medially may be indicative of a lacrimal gland tumour. As mentioned previously, the proptotic eye may exhibit dynamic properties. The most common cause of unilateral proptosis and its bilateral counterpart is thyroid eye disease. That said, any unilateral lesion warrants a meticulous medical work-up to exclude an underlying localised tumour. In some cases, the eye may pulsate as evidenced by large shifts in the semi-circular rings during applanation tonometry. Pulsating eyes imply either a defect in the orbital roof following transmission of the CSF or a vascular malformation, such as an arteriovenous communication whereby the venous system contains arterialisated blood secondary to a fistula. The presence of a bruit (heard by placing the bell of a stethoscope over the closed eye) is virtual-

ly indicative of the latter. Situations whereby venous pressure is augmented such as performing a valsalva manoeuvre will exacerbate a proptosis without an attendant bruit in those patients who possess a purely venous malformation.

Enophthalmos

Recession of the globe, as alluded to earlier, is a known cause of pseudoproptosis. The aetiology of enophthalmos can be thought of as a result of one of the three following abnormalities: first, atrophy of the orbital contents (for example, post radiation therapy); second a cicatrising orbital lesion (for example, metastatic breast carcinoma); and third, bony abnormalities (for example, a blow-out fracture of the orbital floor). It is noteworthy that small globes *per se* are not synonymous with enophthalmos and, as such, are a cause of pseudo-enophthalmos.

Soft tissue involvement

To recapitulate, the soft tissue signs seen in orbital disease include chemosis (swelling of the conjunctiva and caruncle), conjunctival injection and periorbital oedema. Although the latter is relatively specific to orbital disease, the former two may be seen in numerous, common, non-orbital disorders, such as allergic eye disease and infective conjunctivitis. Notwithstanding, the differential diagnosis of the aforesaid signs, in the context of orbital pathology, include thyroid eye disease, orbital cellulitis and orbital inflammatory disease (formerly known as orbital pseudotumour).

Dystopia

The term dystopia refers to displacement of the globe in the coronal plane. It may co-exist with proptosis or its recessive counterpart. Although typically seen in congenital syndromes, such as Goldenhar's syndrome and the craniosynostoses, acquired causes should alert the practitioner to the presence of an extraconal tumour, or, if there is a history of trauma, an orbital fracture.

Ophthalmoplegia

Impeded ocular motility may be secondary to either damage to the muscle *per se* or to its nervous supply. Damage to the former is referred to as restrictive ophthalmoplegia. In order to elucidate the aetiology, the clinician must be cognisant with two techniques that can be readily employed in optometric practice – the differential pressure test and observation of saccadic movements. The first involves measuring the intraocular pressure both in the primary position and in the direction of least motility. A 6mmHg increase in tension from the former to the latter is virtually pathognomonic of a restrictive lesion. The time-honoured forced duction technique has been replaced by the differential pressure test as the clinical investigation of choice by ophthalmologists as it proffers two distinct advantages over its more invasive counterpart – first, it is rel-

atively more comfortable for the patient and second, it is objective. Observation of saccadic eye movements is useful because a reduction in saccadic eye velocity is typically seen in neurological lesions, whereas a normal velocity followed by a sudden abrogation of ocular movement is in keeping with restrictive lesions.

The differential diagnosis of ophthalmoplegia *vis à vis* orbital disease includes orbital cellulitis, orbital inflammatory syndrome and thyroid eye disease.

Reduction in visual acuity

Owing to the fact that patients presenting with overt orbital disease may have co-existing posterior segment involvement, it is obvious that fundus biomicroscopy should be included as part of the clinician's investigative repertoire. One of the causes of visual impairment, optic neuropathy, may not be apparent on fundoscopy necessitating further tests which include, *inter alia*, visual field examination, pupillary actions and those which explore colour vision. Although the causes of optic neuropathy are numerous, the two notable aetiologies of orbital disease are thyroid eye disease and optic nerve tumours.

In severe cases of proptosis, a patient may become lagophthalmic. The resultant inability to close the eyelids leads to exposure keratopathy, thus adversely affecting the patient's vision.

Although choroidal folds are contemporaneous with the onset of severe proptosis, their presence may, in certain circumstances, pre-date the onset of orbital signs. Choroidal folds themselves rarely affect visual acuity unless the macula is involved. Once again, the lesion associated with choroidal folds are similar to those mentioned previously, namely dysthyroid ophthalmopathy, inflammatory lesions and tumours.

Specific conditions

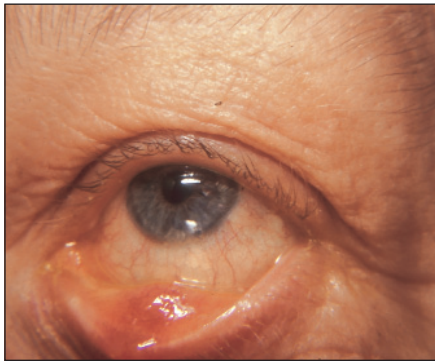
The fact that the most likely orbital maladies to be encountered in optometric practice are thyroid eye disease and preseptal cellulitis, merits further elaboration of these two conditions. Although rare, features of orbital cellulitis will be described as the distinction from its preseptal counterpart can be somewhat nebulous.

Thyroid eye disease

Thyroid eye disease or ophthalmic Grave's disease is the term coined for the ophthalmic manifestations associated with dysthyroid function. Although commonly associated with hyperthyroidism secondary to Grave's disease (an autoimmune disease associated with thyroid stimulating antibodies) the same said manifestations might be observed in patients who have normal thyroid function. Moreover, in those patients who are biochemically hyperthyroid, control of their thyroid status may not ameliorate their ocular signs and symptoms.

Dysthyroid ophthalmopathy has been

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» **Figure 2**
Internal hordeolum
(by courtesy of Dr Leonid Skorin)

classified by Werner under the acronym NO SPECS:

- N:** No signs or symptoms
- O:** Only signs (for example, lid lag, lid retraction)
- S:** Soft tissue involvement (for example, lid swelling)
- P:** Proptosis
- E:** Extraocular involvement
- C:** Corneal ulceration
- S:** Sight loss (corneal ulceration, compressive optic neuropathy, raised intraocular tension)

Eyelid retraction is a common manifestation of Grave's disease affecting as many as 50% of patients. While the literature is replete with numerous eponymous terms to describe retraction depending on the position of gaze such as Kocher's sign (seen in primary gaze), the pathogenesis remains elusive. While some investigators postulate that it is secondary to overaction of the levator-superior rectus complex, others suggest that it is the net result of fibrotic contracture of the levator. An alternative theory suggests that Müller's muscle in the superior eyelid is over-stimulated by the sympathetic nervous system secondary to the increase in circulating thyroid hormones. Whatever the cause, clinicians should be aware that any barring of the sclera either below and, especially, above the upper limbus is highly suggestive of eyelid retraction and warrants further investigation.

As mentioned earlier, thyroid eye disease is the most common cause of both unilateral and bilateral proptosis. As it may co-exist with optic neuropathy, formal tests to assess the health of the nerve should be performed on all patients. In addition, since the cause of optic neuropathy is compression secondary to the enlarged recti muscles, optic nerve dysfunction may not correlate with the degree of proptosis.

Ophthalmoplegia associated with thyroid eye disease is primarily due to inflammatory oedema and secondarily due to fibrotic contracture. It is a relatively common manifestation of thyroid eye disease affecting up to

as many as 50% of patients. The movements most frequently affected are elevation followed by abduction, depression and adduction.

Preseptal and orbital cellulitis

By definition, preseptal cellulitis is an infection of the subcutaneous tissue anterior to the orbital septum. Typically, patients present with a unilateral, hyperaemic oedematous lid which is frequently tender to the touch. The most common causes include infection secondary to eyelid trauma or from infections contiguous with the lids, such as acute hordeolum (**Figure 2**). Whereas preseptal cellulitis can be managed in the primary care setting through administration of broad-spectrum oral antibiotics, it is mandatory to refer all cases of suspect orbital cellulitis to the Hospital Eye Service on the same day.

Orbital cellulitis is recognised by the presence of proptosis, ophthalmoplegia and impairment of visual acuity. Common causes include sinusitis (especially ethmoidal) and extension of a preseptal cellulitis, hence the need to be vigilant when examining and treating these patients. Left untreated, the sequelae associated with this sinister disorder are deleterious and can range from blindness (as a result of vascular occlusion, endophthalmitis or optic neuropathy) to intracranial complications (e.g. meningitis, brain abscess). As a consequence, such patients are admitted to hospital and may require orbital and sinus drainage. Indeed, orbital cellulitis is frequently co-managed by both otolaryngologists and ophthalmologists.

Management of orbital disease

In view of the potential gravity of the aetiologies associated with orbital pathology, practitioners must be cognisant with the fact that the majority of these patients require referral to the Hospital Eye Service on an 'urgent/soon' basis. That said, optometrists play an important role in assuaging certain symptoms, such as exposure keratopathy, through the administration of topical unguents.

The eyelids

Anatomy

The palpebrae protect the eye against extraneous light and from injury. Blinking serves to distribute the tear film across the cornea and also aids tear drainage by pumping movements. It is noteworthy that a rich capillary network exists beneath the lids, since such vessels supply oxygen to the cornea during eye closure.

The boundary of the upper lid is near the eyebrow and is known as the superior sulcus. It is here where the delineation between its orbital and tarsal parts is made. Deep sulci are usually seen in the elderly and, when associated with ptosis, usually imply an involuntional aetiology. By contrast,

the lower lid has no distinct boundary at the cheek.

The dominant upper eyelid elevator, known as the levator muscle, is innervated by the oculomotor nerve. The muscle divides into a flat tendon sheath known as the levator aponeurosis together with Müller's muscle. The latter inserts into the upper border of the tarsus and is innervated by the sympathetic nervous system. Thus, Horner's syndrome, which is a form of oculomotoric paresis, is associated with a lid ptosis resulting from a dearth of nervous supply to Müller's muscle. Although the exact function of this muscle is unknown, the most plausible hypothesis is that it serves to maintain eyelid posture.

The lower lid retractors consist of the inferior tarsal aponeurosis and the inferior tarsal muscle, both of which are analogous to the levator aponeurosis and Müller's muscle respectively.

There are more cilia in the upper than in the lower lid. Owing to the paucity of erectors pilorum muscles, their position is dependent on the surrounding musculature such as the orbicularis oculi, muscle of Riolan and the tarsal plate. The latter is not cartilaginous and comprises of dense connective tissue through which pass the meibomian or tarsal glands. As a consequence, any defect of the tarsal plate or orbicularis muscle may result in malposition of the cilia.

An appreciation of the types of glands that exist in the eyelids is fundamental to the diagnostician's ability to identify and treat patients harbouring eyelid lesions. Although disorders of these oil-producing structures are frequently cystic in nature, occasionally they may be the progenitors of tumour formation.

The meibomian glands are modified sebaceous glands which secrete the outer lipid layer of the tear film. They are more numerous in the upper tarsal plate, with approximately 25 in this region compared to approximately 20 in the lower.

The glands of Zeiss open into the hair follicles of the eyelashes. Functionally, they are comparable with the meibomian glands since they too are modified sebaceous glands.

In contradistinction to the previous glands, the glands of Moll are modified sweat glands. They lie parallel to, and in contact with, the eyelash follicles especially at the rims of the lids.

It is important for practitioners to be knowledgeable regarding the lymphatic drainage system of the eyelids. Whereas the preauricular nodes receive lymph from the upper lid and lateral canthus, the sub-mandibular nodes acquire lymph from the lower lids and medial canthus. Palpation of these lymph nodes is a *sine qua non* of the clinical examination of patients manifesting a suspicious lid mass, since their presence confers localised spread and, as such, more radical treatment.

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Eyelid manifestations

In view of the prodigious array of eyelid disorders, this article concentrates on those conditions most likely to be encountered by optometrists. Eyelid margin disease, such as blepharitis, has been eloquently described in previous CET articles and so the disorders which will be described are under the following three categories:

- Eyelash disorders
- Eyelid malformations
- Benign and malignant eyelid lesions

Eyelash disorders

Disorders of the eyelashes are frequently encountered in optometric practice and, indeed, optometrists play an instrumental role in managing these conditions.

Trichiasis

Trichiasis is a posterior misdirection of the eyelashes which arise from the normal location in the anterior lamellae. Although it may be idiopathic in nature, other aetiologies which may be uncovered during the consultation include trachoma (especially in patients who have been exposed in countries where the organism causing trachoma is endemic), chronic blepharitis and herpes zoster infection (**Figure 3**). Before a diagnosis of trichiasis is made, it is essential that such eyelid misdirection is not secondary to an eyelid malposition such as entropion since the treatments for these conditions are quite different.

Distichiasis

This condition is characterised by the presence of an accessory row of eyelashes emanating from the meibomian orifices. The differential diagnosis includes trichiasis and polytrichia (whereby there are extra lashes originating from the anterior lamellae). Although distichiasis may be congenital, acquired cases are usually secondary to cicatrising lesions such as Stevens-Johnson syndrome and cicatrising pemphigoid.

Madarosis

Madarosis is a diminution or complete loss of eyelashes. There are a myriad of causes, which may be local, dermatological, systemic or iatrogenic in origin. Anterior eyelid margin disease, psoriasis and hypothyroidism are the most frequent primary causes most likely to be encountered by the optometrist.

Eyelid malformations

Although there are many eyelid malformations, the article will concentrate on entropion, ectropion and ptosis.

Entropion

Entropion or inward turning of the eyelid predominantly affects the lower eyelid as the larger tarsal plate in the upper lid affords greater stability (**Figure 4**). While the entropion itself is not deleterious to the

eye, the resultant pseudo-trichiasis is. Entropion is frequently involuntional in origin and is the net combination of both horizontal lid laxity, vertical lid instability (due to either dehiscence or disinsertion of the lower lid retractors), and by the fact that the preseptal portion of the orbicularis muscle may over-ride its pretarsal counterpart during eyelid closure. Other causes to consider are any pathologies which may be implicated in scarring of the palpebral conjunctiva such as trachoma or chemical burns.

Ectropion

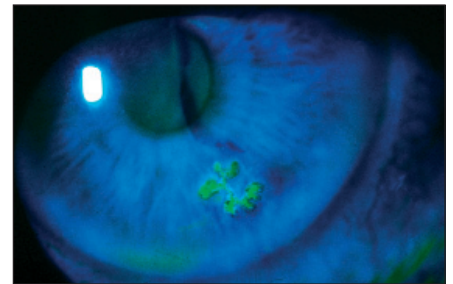
Ectropion refers to outward turning of the lower eyelid. In accordance with entropion, the most common aetiological factors are involuntional changes to the lower eyelid (**Figure 5**). Whereas the initial symptom, experienced by patients manifesting an entropion is ocular irritation, epiphora is the predominant symptom with those who have acquired an ectropion. That said, ocular irritation frequently ensues owing to the resultant tear film instability – a consequence of poor corneal coverage during eyelid closure and inferior exposure keratopathy.

The pathogenesis of involuntional ectropion is due to laxity of either one or all of the following structures: horizontal lid and/or the lateral and medial canthal tendons. In determining which structure is at fault, a number of simple practical tests may be employed by the practitioner. To demonstrate horizontal lid laxity, the clinician should pull the lower eyelid approximately 8mm downwards and release. Failure to return to its original position immediately implies laxity. Medial canthal laxity is demonstrated when, having pulled the lower lid laterally, the lower punctum is displaced more than 2mm. The limbus and pupil may be used as punctal reference points. Thus, if the punctum reaches the edge of the pupil then the degree of laxity is significant. Lateral canthal laxity is noted if the lower lid can be pulled medially more than 2mm.

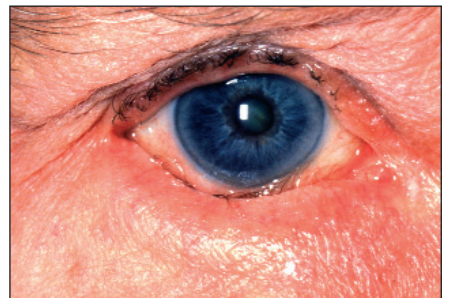
The differential diagnosis includes mechanical causes such as tumours resting on the lower lid, paralytic causes such as in facial nerve palsy, and cicatricial lesions of the eyelid such as dermatitis, or previous trauma.

Ptosis

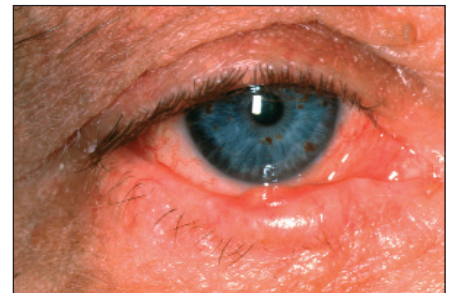
Ptosis is an abnormally low position of the upper eyelid. Whenever confronted with a patient suspected of possessing a ptotic lid, it is imperative that the practitioner is diligent in taking the history. Although the ptosis may be congenital, this should not be assumed if the patient is unsure as to the timing of ptosis. The use of old photographs should either corroborate or refute such claims. Owing to the gravity of some of the underlying conditions associated with acquired cases, enquiries into the patient's systemic health should be sought together



» **Figure 3**
Herpes zoster ophthalmicus
(by courtesy of the Department of Illustration and Photography, Moorfields Eye Hospital)



» **Figure 4**
Chronic entropion
(by courtesy of the Department of Illustration and Photography, Moorfields Eye Hospital)



» **Figure 5**
Ectropion (by courtesy of the Department of Illustration and Photography, Moorfields Eye Hospital)

with further additional ocular symptoms such as worsening of ptosis with fatigue at the end of the day and diplopia are highly suggestive of a systemic rather than a local abnormality.

The differential diagnosis of ptosis and therefore causes of pseudoptosis are as follows:

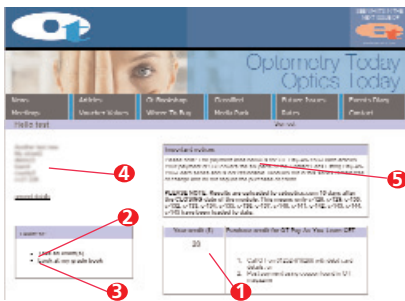
- Contralateral eyelid retraction (diagnosed if the eyelid is at the level or above the limbus)
- Dermatochalasis characterised by excessive skin that may be associated with herniation of orbital fat through a coexisting weak orbital septum. A noteworthy caveat is that dermatochalasis may indeed be a cause of true, mechanical ptosis
- Brow ptosis due to excessive skin over the brow. The diagnosis is readily apparent since lifting the skin reveals the normal lid position

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- Ipsilateral hypotropia is associated with a concomitant lowering of the upper eyelid. The apparent ptosis is alleviated by covering the normal eye and allowing the hypotropic eye to take up fixation

A number of simple tests can be incorporated in the practitioner's routine to not only quantify the degree of ptosis, but also to evaluate which muscle is at fault. This is useful since poor levator function is often seen in congenital cases but is retained in involutional cases.

One simple test aiming to quantify the degree of ptosis is measuring the vertical fissure height. Put simply, this is the distance between the upper and lower lid margins measured in the plane of the pupil. The vertical fissure height in females is generally greater than males. Ptosis is usually quantified against the contralateral normal measurement. In cases where the ptosis is bilateral, the degree of ptosis can be assessed by knowledge of the fact that the normal upper lid rests approximately 2mm below the upper limbus and the lower lid, 1mm above the lower limbus.

Measurement of levator function simply requires the practitioner to apply pressure against the patient's brow with a thumb or finger in order to eliminate the elevating action of the frontalis and to ask the patient to look firstly down and then up. Measurement of the excursion is made with a plastic rule. An excursive movement in the region of 15mm or more is indicative of normal levator function. Poor function is associated with a movement of less than 4mm.

Ptosis can be classified as either mechanical, neurogenic, myogenic or aponeurotic. Although the classification system is self-explanatory, it is important to appreciate that myogenic causes may result from either a defect directly affecting the ocular muscle or to the neuromuscular junction. Examples of each type of ptosis are listed in **Table 2**.

The fatigability test is a useful addition to the practitioner's clinical armoury. Asking the patient to look upwards and downwards in succession may result in a worsening of the ptotic lid/s after 30 seconds to

one minute in patients with either ocular myasthenia or myasthenia gravis. A notable caveat is that patients with an aponeurotic defect may also demonstrate worsening of their ptosis due to fatigue of Müller's muscle, which generally has to work harder to maintain a normal eyelid position.

An alternative approach is to ask the patient to squeeze your hand as tightly as possible. A grip that weakens rapidly may be observed in patients with myasthenia. Failure to release on command is typically seen in patients with myotonic dystrophy.

Benign and malignant eyelid lesions

A comprehensive history serves as a worthwhile investigative tool in establishing whether or not an eyelid lesion has malignant potential. A prolonged history of sun exposure is highly relevant in cases of actinically induced lesions, such as basal cell carcinoma, squamous cell carcinoma and malignant melanoma. In addition, therapeutic ultraviolet exposure experienced by some patients with psoriasis recalcitrant to topical therapy is another risk factor for malignant changes. Lesions which have grown over a relatively short period of time or have undergone morphological changes such as spontaneous or prolonged bleeding should also arouse suspicion. If in doubt, the patient should be encouraged to bring in old photographs if available.

A previous history of basal cell or squamous cell carcinoma on the face or neck confers a greater predisposition toward additional lesions. A patient's complexion should also allow the practitioner to stratify the risk to malignancy further since the risk is inversely proportional to the degree of pigmentation.

The high magnification afforded by the slitlamp biomicroscope allows the practitioner to examine the lesion in great detail. The practitioner should examine the adjacent structures in detail since malignant processes have a tendency to distort the normal eyelid architecture, such as misdirected eyelashes or, more commonly, madarosis. Lumps through which emanate lashes, which are normally directed and of

» **Table 2**
Classification of ptosis

Classification of ptosis	Examples
Mechanical	Tumours Oedema Dermatochalasis
Neurogenic	Oculomotor nerve palsy Marcus Gunn jaw winking syndrome Horner's syndrome
Myogenic	Ocular myopathy Myotonic dystrophy Myasthenia gravis
Aponeurotic	Involucional Postoperative

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normal calibre, are more likely to be benign lesions. As mentioned previously, examination of the lymph nodes is mandatory in anyone presenting with a suspicious lesion.

Applying a bright pen torch in a darkened room allows the practitioner to establish whether or not the lesion transilluminates. Unlike solid lesions, cystic lesions tend to transilluminate.

Malignant eyelid lesions

Basal cell carcinoma is the most common eyelid malignancy and most frequently occurs on the lower eyelid (**Figure 6**). Tumours which are located in the medial canthal region are particularly more nefarious since they have a tendency to invade the orbit and adjacent sinuses. They may present clinically as a nodulo-ulcerative lesion characterised by an indurated mass with telangiectatic vessels traversing its raised, rolled edges or as a morphemic lesion. The latter is a sclerosing lesion with poorly delineated borders and is more extensive to the touch than it is to the naked eye. It may be easily mistaken for chronic blepharitis.

Squamous cell carcinoma resembles basal cell carcinoma, but it is relatively avas-

cular and tends to grow at a much faster rate. Whereas basal cell carcinoma is locally invasive, squamous cell carcinoma is more likely to metastasise. It may arise *de novo* or from a pre-malignant lesion, such as actinic keratosis.

The differential diagnoses of the aforementioned malignancies include recurrent chalazion, chronic blepharitis that has remained recalcitrant to therapy, seborrhic keratosis, keratoacanthoma, verrucae (warts) and cutaneous horn. Of these, the three worthy of further mention are actinic keratoses, keratoacanthoma and cutaneous horn, as all require biopsy to confirm the diagnosis.

Conclusion

This article has outlined the various orbital and eyelid manifestations, together with their aetiologies and differentials, which may present to the optometrist. In addition, a description of various tests which can be readily incorporated into the routine examination have also been described. These will hopefully serve to improve the practitioner's diagnostic acumen when confronted with such patients.



» **Figure 6**

Basal cell carcinoma (by courtesy of the Department of Illustration and Photography, Moorfields Eye Hospital)

Further reading

1. Kanski JJ (2003) *Clinical Ophthalmology*. Fifth edition. Butterworth Heinemann, Oxford.
2. Kanski JJ and Nischal KK (1999) *Ophthalmology. Clinical Signs and Differential Diagnosis*. Mosby, Philadelphia.
3. Saude T (1993) *Ocular Anatomy and Physiology*. Blackwells, Oxford.
4. Parrish II RK (2000) *Atlas of Ophthalmology*. Butterworth Heinemann, Oxford.

Module questions

Course code: c-2686

Please note, there is only one correct answer. Enter online or by form provided.

1. Which one of the following statements is correct regarding orbital anatomy?
 - a. The palatine bone forms part of the floor
 - b. The zygomatic bone forms part of the medial wall
 - c. The ethmoid bone forms part of the roof
 - d. The lacrimal bone forms part of the lateral wall
2. Which one of the following statements regarding proptosis is correct?
 - a. Dystopia always occurs in conjunction with proptosis
 - b. Axial proptosis is never caused by tumours
 - c. Ipsilateral enophthalmos is a cause of pseudoproptosis
 - d. The degree of proptosis can be measured with a rule
3. Which one of the following is not a cause of pseudoproptosis?
 - a. Nanophthalmos
 - b. High myopia
 - c. Ipsilateral eyelid retraction
 - d. Contralateral enophthalmos
4. Which one of the following is a myogenic cause of ptosis?
 - a. Oculomotor nerve palsy
 - b. Marcus Gunn jaw winking syndrome
 - c. Horner's syndrome
 - d. Myasthenia gravis
5. Which one of the following statements is incorrect regarding thyroid eye disease?
 - a. Patients are typically hyperthyroid
 - b. Eyelid retraction is a manifestation
 - c. Treatment of the thyroid dysfunction always corrects the ophthalmic signs
 - d. Corneal ulceration is a complication
6. Which one of the following is suggestive of orbital rather than preseptal cellulitis?
 - a. Hyperaemic lid
 - b. Ophthalmoplegia
 - c. Tenderness
 - d. Previous history of infection
7. Which one of the following statements regarding eyelid anatomy is correct?
 - a. Müller's muscle is innervated by the parasympathetic system
 - b. The levator is innervated by the abducens nerve
 - c. The glands of Zeiss are sweat glands
 - d. The meibomian glands on the upper lid outnumber those on the lower
8. Which one of the following signs are suggestive of malignancy?
 - a. Normal lid architecture
 - b. No documented growth
 - c. Normally directed lashes
 - d. Bleeding
9. Which one of the following is not a differential diagnosis of ptosis?
 - a. Contralateral hypotropia
 - b. Contralateral eyelid retraction
 - c. Dermatochalasis
 - d. Brow ptosis
10. Which one of the following is not a cause of ectropion?
 - a. Dermatitis
 - b. Lower lid mass
 - c. Cicatrising lesion of the palpebral conjunctiva
 - d. Horizontal lid laxity
11. Which one of the following is not a cause of madarosis?
 - a. Anterior eyelid margin disease
 - b. Psoriasis
 - c. Hyperthyroidism
 - d. Malignant lesions
12. Which one of the following statements is correct?
 - a. Distichiasis is always congenital
 - b. Choroidal folds are always symptomatic
 - c. Optic neuropathy secondary to orbital disease is only associated with tumours
 - d. Thyroid eye disease is the most common cause of unilateral proptosis

An answer return form is included in this issue. It should be completed and returned to: CET initiatives (c-2686), OT, Victoria House, 178-180 Fleet Road, Fleet, Hampshire, GU51 4DA by February 8, 2006. Under no circumstances will forms received after this date be marked – the answers to the module will have been published in our February 10, 2006 issue.

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CET answers

Here are the correct answers to Module 8 Part 12 of Therapeutics in clinical practice

– Referral criteria within the context of 'Additional Supply' Course code c-140 which appeared in our December 2, 2005 issue.

1. Which one of the following is NOT associated with a muco-purulent ocular discharge?

- a. Allergic conjunctivitis
- b. Bacterial conjunctivitis
- c. Chlamydial conjunctivitis
- d. Toxic conjunctivitis

a is correct

Allergic conjunctivitis is associated with a serous or mucoid ocular discharge.

2. Non-steroidal anti-inflammatory drops are used in the treatment of which one of the following?

- a. Blepharitis
- b. Episcleritis
- c. Dry eye
- d. Bacterial conjunctivitis

b is correct

Mild cases of episcleritis should be treated with ocular lubricants, such as artificial tear drops, and topical non-steroidal anti-inflammatory drops.

3. Which one of the following statements is correct?

Viral conjunctivitis:

- a. is usually sight threatening
- b. causes a purulent discharge
- c. may be associated with subconjunctival haemorrhages
- d. is non-contagious

c is correct

Clinical features of a viral conjunctivitis include inferior palpebral conjunctival follicles, pinpoint subconjunctival haemorrhages, palpable preauricular lymph node, watery discharge and oedematous eyelids. It is very infectious and can spread rapidly to family members, close contacts and to staff.

4. Which one of the following statements is correct?

Gonococcal eye disease:

- a. is associated with a white eye
- b. may be complicated by corneal perforation
- c. has no risk of corneal scarring
- d. is associated with a watery discharge

b is correct

Gonococcal conjunctivitis needs to be referred urgently for conjunctival swabs/corneal scrape and systemic and topical treatment, as it is rapidly progressive and patients can develop corneal ulceration leading to corneal perforation.

5. Which one of the following statements is correct regarding herpes simplex keratitis (HSK)?

- a. A geographic ulcer is a sign of primary infection
- b. HSK is always associated with a cold sore
- c. The virus may remain inactive in the trigeminal ganglion for years
- d. HSK is usually caused by Type 2 herpes simplex virus infection

c is correct

Once infected with herpes simplex virus, the virus stays with the patient throughout their life and usually lies dormant in the trigeminal nerve ganglion and causes no problems.

6. Which one of the following statements is incorrect regarding vernal keratoconjunctivitis (VKC)?

- a. VKC is characterised by giant cobblestone papillae in the superior tarsal conjunctiva
- b. VKC is often worse in Summer
- c. Shield ulcers are commonly found in the inferior cornea
- d. It typically occurs in young patients

c is correct

VKC is usually seen in young patients, especially boys, and the age of onset is usually before the age of 10. Other atopic manifestations are commonly present, such as asthma and eczema, and there is usually also a family history of atopy. Patients with VKC often have seasonal exacerbations (Spring/Summer) but may have milder symptoms all year round. In VKC, large conjunctival papillae are seen beneath the upper lid, which may be associated with a corneal shield ulcer.

7. Which one of the following statements is incorrect?

Atopic keratoconjunctivitis (AKC):

- a. typically occurs between the ages of 20 and 50 years
- b. is associated with atopic dermatitis
- c. usually affects only one eye
- d. is due to T-cell involvement

c is correct

AKC is usually a bilateral condition. It typically occurs between 20 and 50 years of age and is associated with atopic dermatitis. The chronicity of the condition is attributed to T-cell involvement, and a severe immunopathological response with T-cell conjunctival infiltration can occur.

8. Which one of the following is NOT associated with dry eye?

- a. Horner-Trantas' dots
- b. Redness
- c. Tearing
- d. Corneal filaments

a is correct

Horner-Trantas' dots (limbal or palpebral raised white dots) are associated with AKC and VKC.

9. Which one of the following statements is correct? Episcleritis:

- a. is never associated with systemic disease
- b. usually occurs in elderly patients
- c. may be associated with corneal changes
- d. usually resolves spontaneously

d is correct

Episcleritis can be associated with underlying systemic disease and usually occurs in young adults and there may be a history of recurrent/similar episodes in the past. Corneal changes do not occur with episcleritis.

10. Which one of the following statements is correct? Chlamydial conjunctivitis:

- a. can be treated with topical antibiotics alone
- b. is usually associated with sexual contact
- c. is an airborne infection
- d. is usually associated with copious watery eye discharge

b is correct

Chlamydial inclusion conjunctivitis is associated with a mucoid discharge and is treated using oral and topical antibiotics. Similar to gonococcal conjunctivitis, chlamydial inclusion conjunctivitis typically occurs in newborns and in young sexually active adults.

11. Dry eyes may be associated with which one of the following?

- a. Blepharitis
- b. Scleritis
- c. Episcleritis
- d. Congenital glaucoma

a is correct

Dry eye may occur in association with other eye conditions such as blepharitis, conjunctival scarring, complications due to contact lens wear or an eye lid abnormality.

12. Which one of the following statements is incorrect? Scleritis:

- a. is usually painless
- b. may be associated with a red eye
- c. may be associated with systemic disease
- d. requires ophthalmic referral

a is correct

Unlike episcleritis, the pain of scleritis is severe, deep and boring and may wake the patient at night. Scleritis is sight threatening and may also be life-threatening due to associated systemic disease.

MODULE 9 PART 2

Differential Diagnosis of Ocular Disease

The conjunctiva and sclera

FEBRUARY 10, 2006