

PROTOCOLS IN EYE CONDITIONS



EXPLANATORY TEXT HANDBOOK

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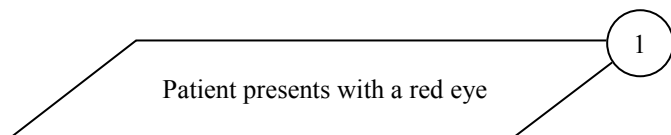
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This handbook contains explanatory texts for three flow chart protocols relating to external segment and eyelid conditions, conjunctivitis and dry eye disease. It is to be used in conjunction with the booklet containing the flow chart protocols, as the handbook provides explanations and references for each step of the protocols. The text is broken down in a series of numbered steps which correspond to the numbered protocol steps in the protocol booklet.

Example:

From protocol booklet:



From handbook:

Box 1

The term “red eye” refers to the presence of redness in the white part of the eyeball. This is due to hyperaemia of the vessels in the conjunctiva or some other part of the eye (Riordan-Eva and Witcher, 2007). Redness in the eye is a symptom which can represent one of many diseases of varying severities, some of which may require prompt referral to an ophthalmologist (Galor and Jeng, 2008).

For a copy of the protocol booklet kindly contact me on bsti0001@um.edu.mt or biancastivala@gmail.com.

Box 1

Conditions related to the eyelid and/or eyelid margin may be of the inflammatory or infectious type. Hordeolum and staphylococcal blepharitis are infectious conditions with inflammation, whereas chalazion, seborrhoeic blepharitis and posterior blepharitis are inflammatory conditions which are not infectious. In some cases secondary infection may occur (Riordan-Eva and Whitcher, 2007). The degree of redness as well as other symptoms typical of particular conditions aid in the differential diagnosis.

Box 2

The pharmacist greets the patient appropriately upon entering the pharmacy.

Box 3

This step is important for the pharmacist to gain knowledge about the medical history of the patient. If the pharmacist is familiar with the patient then there is a chance that certain information related to the medical history is known, however this step establishes if this is the case.

Box 4

This box is referred to from box 3 in cases where the pharmacist does not know the patient at all or if he knows the patient but is not entirely familiar with his/her medical history, especially that related with the eye.

Box 5

This box is used to see whether or not the patient wears contact lenses.

Box 6

Patients who wear contact lenses should be referred to an eye specialist, as contact lenses pose a risk of causing microbial keratitis (Sharma *et al.*, 2009; Blenkinsopp *et al.*, 2005).

Box 7

Checking for the presence of a localised swelling helps the pharmacist between hordeola and chalazia and blepharitis, as the first two present with a localised swelling whereas blepharitis presents with “red-rimmed” eyelids (Riordan-Eva and Whitcher, 2007). In some chronic cases of blepharitis, hordeola or chalazia may be present concurrently with the blepharitis, in which case they can help in the identification of the type of blepharitis (American Academy of Ophthalmology, 2008).

Box 8

Redness is more commonly associated with hordeolum rather than chalazion, which presents as a firm, white swelling (Khurana, 2007).

Box 9

This box indicates that there no redness on the lesion, which is in tandem with the clinical picture for chalazion as explained above. Further examination is however required to confirm the diagnosis.

Box 10

Tenderness is reported in cases of hordeolum and chalazion (Riordan-Eva and Whitcher, 2007).

Box 11

As tenderness is present in both hordeolum and chalazion, the presence or absence of pain helps in differentiating the two. Chalazion is characterised by a painless swelling, whereas acute pain is reported in hordeolum cases (Khurana, 2007). In hordeolum, the intensity of pain is directly proportional to the amount of lid swelling (Riordan-Eva and Whitcher, 2007).

Box 12

Tenderness without pain is typical of chalazion (Riordan-Eva and Whitcher, 2007).

Box 13

The direction in which the lump points gives an indication of what condition the patient has. The lump can either point towards the skin/eyelid margin or towards the conjunctival surface (Riordan-Eva and Whitcher, 2007).

Box 14

A lump pointing to the eyelid margin is typical of hordeolum. An external hordeolum always points towards the eyelid margin, whereas an internal hordeolum may either point to the eyelid margin or towards the conjunctival surface. Most chalazia point towards the conjunctival surface (Riordan-Eva and Whitcher, 2007).

Box 15

A chalazion is a sterile lipogranulomatous inflammation caused by the obstruction of a meibomian gland. It may become secondarily infected, in which case it may be difficult to distinguish from internal hordeolum (Schlote *et al.*, 2006). Large chalazia may press on the eyeball, hence causing astigmatism. Development of chalazia is usually over a period of weeks, in contrast with hordeola which present with acute symptoms of inflammation (Riordan-Eva and Whitcher, 2007). Patients with rosacea, seborrhoeic dermatitis, blepharitis or diabetes mellitus are more prone to suffering from chalazia (Gilchrist and Lee, 2009; Schlote *et al.*, 2006).

Box 16

It is important for the pharmacist to investigate whether the patient has had other chalazia in the same place, as recurrent chalazia may in fact be meibomian gland carcinoma (Gilchrist and Lee, 2009).

Box 17

In case of recurrent chalazia in the same place, the pharmacist should refer the patient to an ophthalmologist for a biopsy (Gilchrist and Lee, 2009).

Box 18

First-line treatment for chalazion includes warm compresses applied twice daily for 3-

5 minutes. The lesion should also be massaged in the direction of the eyelashes using clean fingers or cotton tips in order to release the contents of the chalazion. This should be continued for a few weeks until the swelling subsides. In cases where infection is suspected a topical antibiotic ointment is prescribed by the specialist (Gilchrist and Lee, 2009).

If warm compresses are not sufficient to treat the chalazion, intralesional steroid therapy using triamcinolone is performed by the specialist. If this second option does not work, the chalazion is removed surgically using an incision and curettage procedure (Gilchrist and Lee, 2009).

Increased consumption of vitamin A has been found to improve the progress of chalazia, as well as helping prevent recurrence (Gaby, 2008).

Box 19

Checking for the presence of a white/yellowish core of pus on a red lump can help indicate the stage or type of hordeolum. A red lump with a core of pus is indicative of an external hordeolum which is pointing and is about to discharge (Blenkinsopp *et al.*, 2005). A red lump without any purulent cores requires further investigation.

Box 20

An external hordeolum (stye) is an infection of Zeis' or Moll's glands which are found in the eyelid margin. The pathogen is usually *Staphylococcus aureus* (Riordan-Eva and Whitcher, 2007). It starts as a red, painful lump which eventually points and discharges if left untreated (Blenkinsopp *et al.*, 2005).

Box 21

Treatment consists of warm compresses applied 3-4 times daily for 10-15 minutes, as application of heat encourages the hordeolum to point and discharge (Blenkinsopp *et al.*, 2005). If symptoms do not begin to resolve after 48 hours the patient should be referred as local antibiotic therapy may be required. If that is not sufficient, incision and drainage of the lump is recommended (Riordan-Eva and Whitcher, 2007).

Box 22

In the case that the hordeolum does not have any pus on the outside, the pharmacist should check the inner part of the eyelid to see if there is any pus present. The pharmacist should gently evert the eyelid to see the inner part of the lump after disinfecting the hands with an appropriate agent such as an alcohol sanitiser.

Box 23

The presence of pus on the inside of the lump near the conjunctival surface indicates an internal hordeolum. If there is no pus the lump is probably an external hordeolum which has not started to point (Blenkinsopp *et al.*, 2005).

Box 24

An internal hordeolum is an infection of the meibomian glands located on the inner side of the eyelid (Blenkinsopp *et al.*, 2005). It may point to the eyelid margin or to the conjunctival surface; in the latter case it may be difficult to distinguish from a chalazion with secondary bacterial infection (Schlote *et al.*, 2006).

Box 25

Seborrhoeic dermatitis is present in 95% of cases with seborrhoeic blepharitis and 74% of cases with posterior blepharitis. Further investigations to distinguish between the two are required, as management strategies vary for each type of blepharitis, although very often both are present concurrently (American Academy of Ophthalmology, 2008).

Box 26

The presence of greasy scales is indicative of seborrhoeic blepharitis (Riordan-Eva and Witcher, 2007).

Box 27

Seborrhoeic blepharitis is a type of anterior blepharitis resulting from an overproduction of sebum by the Zeis and meibomian glands (Schlote *et al.*, 2006). It is characterised by greasy scales on the eyelashes. Unlike the other type of anterior

blepharitis, ulceration of the eyelid margins does not occur (Riordan-Eva and Witcher, 2007).

Box 28

Posterior blepharitis is inflammation of the eyelids secondary to meibomian gland dysfunction. Symptoms include frothy discharge and production of secretions upon gentle pressure over the meibomian glands (Riordan-Eva and Witcher, 2007). It is sometimes referred to as meibomian gland dysfunction (American Academy of Ophthalmology, 2008).

Box 29

Treatment for all types of blepharitis includes eyelid hygiene and warm compresses. Since blepharitis is a chronic condition, these may need to be continued indefinitely. In some cases antibiotic therapy may be required.

Eyelid hygiene is important for cases of anterior blepharitis as it is a way of removing the scales found on the eyelashes. This can be achieved by brief, gentle massage of the eyelids using diluted baby shampoo or eyelid cleanser on a cotton pad or a clean fingertip. Rubbing from side to side removes crusts and scales from the eyelashes. For posterior blepharitis, vertical massage of the eyelid is used to express meibomian secretions. A once daily regimen is generally adequate, however some patients may repeat it several times daily; in such cases care must be taken as irritation may result due to increased frequency of application (American Academy of Ophthalmology, 2008).

Warm compresses are especially useful in the treatment of posterior blepharitis as they help warm meibomian secretions. They are also used to soften crusts before applying eyelid hygiene in cases of anterior blepharitis. These consist of hot tap water on a clean wash cloth applied for several minutes. The water should be hot, but not hot enough to burn the skin. Other measures include heating a gel pack or a bag of rice (American Academy of Ophthalmology, 2008).

In cases where the patient also has seborrhoeic dermatitis, any areas which are affected should be kept clean by means of soap water and shampoo (Riordan-Eva and Whitcher, 2007).

In severe cases which do not respond to eyelid hygiene and warm compresses, antibiotic therapy is required. Topical antibiotic ointment is prescribed for anterior blepharitis, whereas an oral antibiotic is preferred for posterior blepharitis (American Academy of Ophthalmology, 2008).

A diet containing increased intake of essential fatty acids has been found to improve symptoms of posterior blepharitis (Gaby, 2008).

Box 30

Dry scales are typical of staphylococcal blepharitis, however they may also be present in mixed infection (Riordan-Eva and Whitcher, 2007). The scales, often referred to as collarettes, can be observed on the eyelid margin at the base of the eyelashes (American Academy of Ophthalmology, 2008). If dry scales are not seen, the pharmacist should go to box 26, as seborrhoeic and posterior blepharitis may be present without seborrhoeic dermatitis.

Box 31

Checking for the presence of greasy scales alongside the dry scales helps distinguish mixed infection from standalone staphylococcal blepharitis (Riordan-Eva and Whitcher, 2007).

Box 32

Staphylococcal blepharitis is a type of anterior blepharitis caused by infection of the eyelash follicles by *Staphylococcus aureus* (Schlote *et al.*, 2006). It is sometimes also referred to as ulcerative blepharitis as it causes small ulcers along the eyelid margin. In more severe cases, lashes tend to fall out or grow in a distorted fashion (Riordan-Eva and Whitcher, 2007).

Box 33

Mixed infection occurs when staphylococcal and seborrhoeic blepharitis occur simultaneously. It is characterised by the presence of both greasy and dry scales (Riordan-Eva and Whitcher, 2007).

Box 34

See text for box 29.

Box 1

The term “red eye” refers to the presence of redness in the white part of the eyeball. This is due to hyperaemia of the vessels in the conjunctiva or some other part of the eye (Riordan-Eva and Witcher, 2007). Redness in the eye is a symptom which can represent one of many diseases of varying severities, some of which may require prompt referral to an ophthalmologist (Galor and Jeng, 2008).

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Box 4

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Box 5

This box is used to see if the patient feels any pain in one or both eyes.

Box 6

A painful red eye is often indicative of conjunctivitis with corneal involvement (Schlote *et al.*, 2006). In such situations the patient should be referred to an ophthalmologist. Pain may however be present in other eye conditions which may be identified by means of other symptoms are present concurrently, for example if the patient sees halos around lights then he/she may have glaucoma (Galor and Jeng, 2008).

Box 7

This box is used to see whether or not the patient wears contact lenses.

Box 8

Patients who wear contact lenses should be referred to an ophthalmologist as contact lens use may give rise to a wide range of ocular diseases, some of which may be more serious than they appear. Microbial keratitis is a serious condition requiring specialist care as damage to the cornea may be permanent (Sharma *et al.*, 2009).

Box 9

A red eye may bring to mind trauma or physical injury, therefore it would be useful to question the patient on whether he or she has suffered any physical injury to the eye

Box 10

In cases where the patient has suffered a trauma it would be ideal to refer the patient to a general practitioner as damage to the underlying tissues may be present and unseen.

Box 11

Once it is known that there is no pain or other classic symptoms of some other disease, one may begin to suspect conjunctivitis. At this stage it is important to check whether symptoms are unilateral or bilateral, as this is highly indicative of the type of conjunctivitis (American Academy of Ophthalmology, 2008). This would need to be followed by further questioning about the onset of the redness to gain information about the history of the laterality.

Box 12

It is not enough to check if the redness is unilateral, the pharmacist must also question the patient about the symptoms before presenting with the complaint.

Box 13

Upon observation of a unilateral red eye, it is important to investigate the duration of

symptoms by asking for how long they have been present. An infectious component usually starts off in one eye and after a few days the second eye also becomes infected (Høvding, 2008). Infection spread from one eye to the other generally occurs by eye-hand contact (Morrow and Abbott, 1998). If the symptoms are found to be present unilaterally then for less than a week, then one can deduce that the condition is of an infectious nature but has not yet spread to the other eye.

Box 14

In the case where symptoms were always unilateral, referral to an eye specialist is required, as a unilateral red eye is indicative of something which requires thorough assessment by a specialist (Sharma *et al.*, 2009). Episcleritis is often difficult to distinguish from conjunctivitis, as the redness is similar, however in the case of episcleritis redness is unilateral (Schlote *et al.*, 2006). Recurrent episodes of acute unioocular redness should be reviewed for recurrent *Herpes simplex* keratitis or recurrent iridocyclitis (Høvding, 2008).

Box 15

After establishing that the symptoms are bilateral, it is important to know whether the symptoms were always bilateral or whether they started off as unilateral. An inflammation which has always been bilateral is indicative of an allergic component, whereas unilateral symptoms which progress to bilateral are most probably of an infectious nature.

Box 16

Infectious conjunctivitis can present with unilateral or bilateral symptoms, with the most common presentation being sequentially bilateral (American Academy of Ophthalmology, 2008). The causes can be bacterial, viral or chlamydial, though further investigation of symptoms is required to differentiate. In bacterial conjunctivitis, the infection is spread to the second eye 2-3 days after infection of the first eye (Schlote *et al.*, 2006).

Box 17

This box confirms that the symptoms were always bilateral.

Box 18

The presence or absence of itchiness in the eyes is an important symptom which distinguishes allergic conjunctivitis from other types of bilateral conjunctivitis, as itching is the classic symptom of an allergic component (Morrow and Abbott, 1998).

Box 19

Bilateral red eye without itching is generally not considered to be of an allergic nature therefore such cases should be referred to an eye specialist (Morrow and Abbott, 1998). Conjunctivitis of the immune-mediated type could be suspected, however it is not very common and requires specialist care (American Academy of Ophthalmology, 2008).

Box 20

Allergic conjunctivitis is characterised by itching and a mucoid discharge in both eyes upon exposure to allergens (Morrow and Abbott, 1998). Allergic rhinitis, asthma or atopic dermatitis are allergic symptoms which may be present concomitantly (Tarabishy and Jeng, 2008).

Box 21

Removal of allergens is an important first step in attempting to reduce the incidence of allergic conjunctivitis and pharmacological treatment is only symptomatic (Riordan-Eva and Witcher, 2007). Artificial tears are useful to dilute the allergens and hydrate the surface of the eye (American Academy of Ophthalmology, 2008).

In mild cases of seasonal allergic conjunctivitis a topical antihistamine/vasoconstrictor agent such as naphazoline or a topical histamine H1-receptor antagonist such as levocabastine are recommended as first line treatment (American Academy of Ophthalmology, 2008). Oral antihistamines are generally used in cases where there are concurrent symptoms of rhinitis.

Mast cell stabilisers such as sodium cromoglicate are preferred for more recurrent or persistent cases due as their effects are found to be more long lasting (American Academy of Ophthalmology, 2008).

In more severe cases not adequately controlled after 2 weeks with non-prescription medications, the patient should be referred to an ophthalmologist as topical corticosteroid therapy would be required (Galor and Jeng, 2008). This therapy is also useful in controlling severe symptoms in acute exacerbations of atopic or vernal conjunctivitis. Here topical corticosteroids are often coupled with topical cyclosporine 2% as adjunctive therapy in order to reduce the dose of the topical steroid (American Academy of Ophthalmology, 2008).

Box 22

The type and colour of discharge is common way of distinguishing different types of infectious conjunctivitis from one another (Galor and Jeng, 2008).

Box 23

In the absence of discharge referral is warranted, as the patient may require examination by an ophthalmologist (American Academy of Ophthalmology, 2008).

Box 24

Purulent discharge which persists throughout the day is typical of bacterial conjunctivitis. This discharge should not be confused with the meibomian gland secretions present in the corners of the eyes (medial canthus). These secretions accumulate during sleep and hence are not present during the day (Tarabishy and Jeng, 2008). Mucopurulent discharge, as the name implies, contains both mucus and pus.

Box 25

Watery discharge is typical of viral conjunctivitis.

Box 26

Viral conjunctivitis is characterised by itching and watery discharge. Patients may also have had a recent upper respiratory tract infection (Tarabishy and Jeng, 2008). In some cases the patient may also have a slight fever (Riordan-Eva and Whitcher, 2007). Infection starts in one eye and spreads to the other within the next week. Preauricular lymphadenopathy is almost always present (Høvding, 2008). These symptoms are associated with adenoviral conjunctivitis, and herpes simplex conjunctivitis presents unilaterally with pain and therefore warrants referral (Granet, 2008).

Box 27

Adenoviral conjunctivitis is highly contagious, therefore it is important to advise patients about good eye hygiene to prevent spread of infection. Treatment is mainly supportive and includes cool compresses, artificial tears and/or topical antihistamines (American Academy of Ophthalmology).

Box 28

Bacterial conjunctivitis is a unilateral or bilateral infection confirmed by the presence of purulent or mucopurulent discharge which persists throughout the day. Mucopurulent discharge refers to discharge containing both mucus and pus (Martin, 2007). The presence of sticky eyelids upon waking up in the morning has an odds ratio of 15:1 in being indicative of a bacterial infection (Tarabishy and Jeng, 2008). Infection spreads from one eye to the other by the hands 1-2 days after infection of the first eye (Høvding, 2008).

Staphylococcus aureus and *Haemophilus influenzae* are the most common causes of bacterial conjunctivitis in adults (Tarabishy and Jeng, 2008). Other pathogens include *Neisseria gonorrhoeae* and *Chlamydia trachomatis*; in the case of chlamydial infection the disease is referred to as inclusion conjunctivitis in adults (Riordan-Eva and Whitcher, 2007).

It is important to detect whether the bacterial conjunctivitis is acute or chronic, as the management strategy differs from one type to another.

Box 29

The preauricular lymph nodes are found immediately in front of the ear. An enlarged preauricular lymph node is present in viral and chlamydial inclusion conjunctivitis, however in this case viral infection is ruled out since purulent/mucopurulent discharge is observed (Granet, 2008). In the absence of a preauricular lymphadenopathy bacterial conjunctivitis is suspected. This symptom is not diagnostic of chlamydial conjunctivitis, however it may be present in some cases.

Box 30

Chlamydial inclusion conjunctivitis is caused by *Chlamydia trachomatis*, which is also the cause of trachoma, another form of chlamydial conjunctivitis (Granet, 2008). Inclusion conjunctivitis is found in newborns (ophthalmia neonatorum) and in sexually active adults. The adult patient may also have concurrent genital tract infection which is often asymptomatic (Galor and Jeng, 2008).

Treatment primarily consists of systemic antibiotic therapy prescribed by the specialist, which for adults includes a single oral dose of 1g azithromycin; sexual partners of the sexually active patient must also be referred (Tarabishy and Jeng, 2008).

Box 31

Checking for the presence of blepharitis along with a red eye and purulent discharge helps distinguish between acute and chronic bacterial conjunctivitis.

Box 32

Acute bacterial conjunctivitis is an infection characterised by purulent or mucopurulent discharge, “sticky eyelids” in the morning and moderate conjunctival hyperaemia. It usually begins unilaterally and spreads to the second eye via the hands after 1-2 days (Høvdning, 2008).

The patient should be referred to an eye specialist as treatment, if given, consists of topical antibiotics. Acute bacterial conjunctivitis is often self-limited, in which case it

may last around 8 days. Topical antibiotics reduce the duration of the infection and prevent the occurrence of sequelae such as corneal infection (Tarabishy and Jeng, 2008). They also reduce the risk of contagious spread (Bertino, 2009).

Box 33

Chronic bacterial conjunctivitis is commonly caused by *Staphylococcus aureus* and lasts for more than 4 weeks (Høvdning, 2008). It is often associated with blepharitis and/or meibomian gland dysfunction. The former is characterised by erythema and crusts along the eyelid margin (Riordan-Eva and Witcher, 2007). Styes and chalazia may also be present (Granet, 2008).

Box 34

Treatment aims to target the conjunctival and eyelid margin infections. Good eyelid hygiene and removal of eyelid crusts can be done using warm compresses and eyelid margin scrubs. Antibiotic treatment is assigned in more severe cases after review of bacterial culture results (Granet, 2008).

Box 1

Foreign body sensation is a symptom which is present in many other ocular conditions such as eyelid malposition, viral conjunctivitis and blepharitis, therefore more symptoms must be looked out for (Galor and Jeng, 2008). It is however the most common presenting complaint of patients with dry eye, with patients stating they have a scratchy or sandy feeling in both eyes (Riordan-Eva and Whitcher, 2007).

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Box 5

This box is used to see whether or not the patient wears contact lenses.

Box 6

Patients with contact lenses should be referred to a specialist as they pose a risk of microbial keratitis (Sharma *et al.*, 2006)

Box 7

Checking if the eye is red helps distinguish dry eye from many other pathologies which present with a red eye. Upon initial examination without diagnostic methods, the eye appears normal (Riordan-Eva and Whitcher, 2007).

Box 8

In cases where the patient has a red eye, the pharmacist is advised to follow the conjunctivitis protocol.

Box 9

Patients with posterior blepharitis are at risk of suffering from dry eye disease with increased tear evaporation (American Academy of Ophthalmology, 2008). Symptoms of posterior blepharitis include frothy discharge and production of secretions upon gentle pressure over the meibomian glands (Riordan-Eva and Whitcher, 2007).

Box 10

In such cases it is important to treat both blepharitis and dry eyes.

Treatment of blepharitis includes warm compresses and eyelid hygiene applied at least once daily. More information about treatment for posterior blepharitis can be found in the explanatory text for box 29 of the external segment conditions protocol.

The mainstay of treatment for dry eyes is artificial tear substitutes containing sodium hyaluronate, hypromellose or hydroxypropyl guar. It is advisable to dispense formulations which do not contain preservatives such as benzalkonium chloride, as these cause damage to epithelial cells and further destabilise the tear film (Gayton, 2009). In patients who have mild or episodic symptoms of dry eye, formulations containing preservatives are permissible since they will not be used on a long-term or frequent basis (American Academy of Ophthalmology, 2008).

Reduced intake of foods containing omega-3 fatty acids is thought to increase incidence of dry eye disease, therefore inclusion of such foods in the diet is beneficial. Consumption of alcohol should be reduced as it causes dehydration and exacerbates symptoms (Gayton, 2009). Vitamin A deficiency is also associated with the presence of dry eye, therefore increased consumption of foods containing vitamin A is helpful (Gaby, 2008).

If symptoms of dryness do not improve, or if the patient finds the need to apply artificial tears very frequently, specialist referral is warranted.

Box 11

This box enables the pharmacist to know whether the patient smokes or is exposed to any second-hand smoke.

Box 12

Cigarette smoking or exposure to smoke via passive smoking predispose to dry eye disease due to their negative effects on the lipid component of the tear film (American Academy of Ophthalmology, 2008).

Box 13

Stopping smoking or reducing exposure to tobacco smoke is important as smoke renders the tear film unstable and reduces tear production (Gayton, 2009).

Box 14

This box aims to give the pharmacist knowledge on whether the patient is taking any topical medications for another ocular condition.

Box 15

If the patient is taking topical medications or some other product which does not contain any medicinal products, particularly eye drops, then the dry eye may be present due to their use. This is commonly due to preservatives such as benzalkonium chloride (Gayton, 2009).

Box 16

If the patient is making use of a non-prescription product, such as an eyewash, the pharmacist should discuss the issue with the patient and advise him or her to stop using the product. If the patient still feels the need to use it, then the pharmacist can recommend an alternative formulation which is preservative-free (Gayton, 2009). Preservative-free formulations of artificial tears can be dispensed, however if the

patient is taking another topical medication he or she must wait fifteen minutes between application of products (American Academy of Ophthalmology, 2008).

In case of prescription medications for other ocular conditions, the patient should be referred to the specialist who prescribed the product in order to re-evaluate treatment (Gayton, 2009).

Box 17

The female gender predisposes to the incidence of dry eye disease (Gayton, 2008).

Box 18

Post-menopausal women who take oestrogen only hormone replacement therapy (HRT) are at a higher risk of suffering from dry eye disease when compared to women who have never had HRT (Gayton, 2009).

Box 19

If the patient is taking oestrogen only HRT then she should be referred to a doctor in order to readjust the dose or change therapy.

Box 20

It is important for the pharmacist to know if the patient is taking any systemic medications, particularly diuretics and oral antihistamines as these may predispose to dry eye disease (Gayton, 2009). Other medications implicated in dry eye disease include antidepressants, anticholinergics diuretics and isotretinoin (American Academy of Ophthalmology, 2008).

Box 21

This box checks if the patient shows symptoms of dry mouth along with symptoms of dry eye. Symptoms of dry mouth include dysphagia, inflamed gums and dental caries (Martin, 2007).

Box 22

Concomitant dry eyes and dry mouth is indicative of primary Sjögren's syndrome. If rheumatoid arthritis or another autoimmune disease is also present it is referred to as secondary Sjögren's syndrome. Patients with suspected Sjögren's syndrome should be referred to a rheumatologist for systemic therapy, and later to an ophthalmologist to assess severity of dry eye symptoms (American Academy of Ophthalmology, 2008).

Box 23

Certain systemic medications have drying side-effects which lead directly to or exacerbate dry eye (Gayton, 2009).

Box 24

Whenever possible the patient should be advised to stop taking any medications which cause or aggravate dry eye. In the case of prescription medications the patient should be referred to the prescribing doctor in order to re-evaluate treatment (American Academy of Ophthalmology, 2008).

Box 25

This box seeks to know if the patient spends a long time in front of a computer or television screen or reading.

Box 26

Prolonged visual tasking reduces the blinking rate and hence provokes symptoms of dry eye. Here the dry eye is referred to as episodic since the symptoms improve and may disappear altogether after environmental modifications are carried out (Gayton, 2009).

Box 27

The patient should be advised to carry out environmental modifications by controlling the humidity of the room; low humidity impacts negatively on the stability of the tear film (Gayton, 2009). Other measures include decreasing lid aperture by lowering computer screens to below eye level, taking regular breaks and deliberate frequent

blinking while using a computer or reading. Dietary modifications and dispensing of artificial tears, as with other causes of dry eye, are also recommended (American Academy of Ophthalmology, 2008).

Box 28

If the patient shows symptoms of dry eye with an unknown aetiology, referral to an eye specialist is warranted as further diagnostic tests would need to be carried out. Dry eye disease may exist with a neurological condition such as Bell's palsy and Parkinson's disease (American Academy of Ophthalmology, 2008). Patients suffering from type 2 diabetes have a high prevalence of dry eye disease (Manaviat *et al.*, 2008).

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