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The conjunctivea: diseases and Thumours

Paul A Hunter
The conjunctiva is the transparent mucous membrane which lines the inner surfaces of the eyelids and is reflected over the anterior episclera and sclera before terminating at the limbus where it is continuous with the corneal epithelium. In the embryo the conjunctiva develops from the ectoderm covering the lids and surface of the globe and is formed during the third month of intrauterine life as the eyelids grow together. A healthy conjunctiva is essential for normal ocular function; together with the eyelids it is critical in maintaining a suitable environment for the cornea to function as the primary refractive element of the eye. Its mucous and accessory lacrimal secretions are important components of the precorneal tear film and their deficiency gives rise to tear film instability and poor wetting of the corneal surface, which may lead eventually to pathological changes in the cornea. It follows, therefore, that examination of the whole conjunctival surface is necessary in order to interpret signs in the cornea and an understanding of conjunctival pathology is a prerequisite for correct management of corneal diseases. As part of its function in maintaining the corneal environment the conjunctiva also has an important role in the defence of the eye against a variety of agents and responds in a number of ways producing different clinical patterns of disease.

THE NORMAL CONJUNCTIVA

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**Fig. 3.1** The conjunctiva is comprised of a bulbar portion investing the anterior part of the globe (except for the cornea), and two palpebral portions which cover the posterior aspects of the upper and lower eyelids. The palpebral and bulbar conjunctiva are continuous via the upper and lower fornices. The blood supply of the conjunctiva is derived mainly from that of the eyelids with some contribution from the anterior ciliary vessels in its bulbar portion by the limbal plexus. The nerve supply is mainly from the ophthalmic division of the trigeminal nerve, but a variable proportion of the inferior conjunctiva is supplied through branches of the maxillary division.

**Fig. 3.2** The bulbar conjunctiva is normally transparent making the subconjunctival and episcleral blood vessels easily visible. Its anterior limit is the limbus where the epithelium becomes continuous with that of the cornea. The normal limbal arcade of blood vessels (formed by the anastomosis of the terminal branches of the posterior conjunctival and anterior ciliary vessels) may extend a short distance onto the cornea, but in so doing terminates in an even border on the clear cornea.

**Fig. 3.3** The lower palpebral conjunctiva may be readily inspected by gentle downward traction on the lower eyelid. It is slightly thicker than the bulbar conjunctiva and is highly vascular, especially in its tarsal portion where it derives its blood supply from the tarsal arcades. The lower fornix itself has few blood vessels but a larger amount of lymphoid tissue and mucus secreting glands.
Fig. 3.4 The upper tarsal conjunctiva is inspected by everting the upper eyelid. As in the lower lid, it is firmly adherent to the underlying tarsal plate. The blood supply is derived from the palpebral arcades whose branches are readily visible. A small number of lymphoid follicles can often be seen at the medial and lateral aspects of its upper border.

Fig. 3.5 The upper fornix is only visible on double eversion of the upper eyelids using a retractor. Here the posterior conjunctival vessels are visible and interspersed with yellowish patches of inactive lymphoid tissue. It is particularly important to examine the upper fornix when searching for foreign bodies or in cases of suspected chlamydial conjunctivitis when enlarged follicles are seen (see Chapter 4).

Fig. 3.6 The microscopic anatomy of the conjunctiva shows it to consist of nonkeratinizing squamous epithelium overlying a substantia propria. In its tarsal portion, the connective tissue elements of the latter form a fine network creating a papillary structure, but towards the fornices it is looser and contains elastic fibres, blood vessels and lymphoid tissue. In addition, the conjunctiva contains numerous goblet (mucus secreting) cells, especially in the fornices, and the accessory (lacrimal) glands of Krause and Wolfring.
SURFACE CELL MORPHOLOGY

The morphology of the surface cells of the conjunctiva may be examined in vivo by means of impression cytology. This technique involves the application of a strip of filter paper to the area of conjunctiva under investigation. Upon removal of the strip the surface cells remain adherent and these can subsequently be stained histologically with periodic acid-Schiff (PAS) or haematoxylin to enable a quantitative and qualitative assessment of the conjunctival epithelium.

![Image](image1)

Fig. 3.7 The characteristic morphology of the bulbar conjunctiva with numerous mucus secreting goblet cells can be seen, interspersed between the polygonal, rather irregularly arranged epithelial cells. By courtesy of Professor Noel Dilley.

![Image](image2)

Fig. 3.8 An impression taken from the tarsal plate shows normal conjunctival epithelial cells, but no goblet cells are present. This technique is currently under investigation as a means of differentiating changes in the conjunctival cell population in health and disease. By courtesy of Professor Noel Dilley.

PATHOLOGICAL CHANGES OF THE CONJUNCTIVA

The conjunctiva may undergo a variety of changes as a result of disease. Recognition of the types of change may give valuable information as to the aetiology of the disease, but it should always be remembered that the conjunctiva has a limited repertoire of pathological responses and great care should be exercised before attributing particular conjunctival signs to a diagnosis. It is rare for pathognomonic findings to occur in the conjunctiva and diagnosis should always be based on the history and examination of the adjacent tissues such as the lids and cornea, as well as the conjunctiva.

![Image](image3)

Fig. 3.9 Hyperaemia of the conjunctiva may occur as part of an acute inflammatory process or in response to chronic irritative factors. There is an increase in the number, calibre, and tortuosity of the vessels producing a characteristic bright red appearance. Hyperaemia is often associated with increased vascular permeability and oedema or cellular infiltration.
Fig. 3.10 Avascularity of the conjunctiva is a toxic reaction occurring when the vascular endothelium of the conjunctival vessels is damaged as a result of a chemical insult. The affected conjunctiva is blanched. Depending on the degree of penetration of the chemical agent the episcleral and scleral vessels may be spared as in this example. Such changes are most commonly seen acutely following alkali burns but may also follow subconjunctival antibiotic injections or prolonged use of topical antiviral preparations, as in this case, resulting from trifluorothymidine administration.

Fig. 3.11 Congestion of the conjunctival vessels arises as a result of impaired venous drainage or increased permeability which if severe may produce oedema of the conjunctiva (chemosis). The characteristic dusky red colouration results from an increased stasis within the conjunctiva. Chemosis without venous congestion occurs most commonly in association with acute allergic states when the pale swollen conjunctiva takes on a jelly-like appearance.

Fig. 3.12 Subconjunctival haemorrhages most frequently arise spontaneously when they appear as red patches extending to the limbus. They may result from an episode of raised venous pressure, for example, following coughing, or rarely from blood dyscrasias, vessel anomalies or trauma. In this last instance, if no posterior limit to the haemorrhage is defined, the blood may have resulted from a middle or anterior cranial fossa fracture and patients should be examined with this in mind.
Fig. 3.13 Papillae are seen in the palpebral conjunctiva during acute inflammatory states and represent an exaggeration of some aspects of the normal conjunctival anatomy. Clinically they can be recognized as small elevations of the conjunctiva which give the tissues a velvety appearance. In this example the minute surface irregularity produced by the individual papillae are highlighted in the light reflex laterally. Each papilla contains a central dilated arteriole with a surrounding clear or slightly infiltrated zone of swollen conjunctiva. Usually, they can only be seen on biomicroscopic examination, but in some chronic conditions giant papillae may form which can be seen with the naked eye.

Fig. 3.14 Histologically, the conjunctiva between individual papillae is tethered to the underlying tarsal plate by the fibrous network normally present in the substantia propria and the papillae are produced by oedema, cellular infiltration and vasodilation within the spaces of this meshwork. A dilated central blood vessel can be seen in some papillae in this section; many chronic inflammatory cells are also present.

Fig. 3.15 The clinical appearance of follicles is of large pinkish or pale grey elevations lying beneath the conjunctival epithelium with small blood vessels frequently visible on their surface. In the early stages, they are present only in the fornices but may extend onto the tarsi if the disease becomes chronic. They are especially associated with those conditions in which cell mediated immune mechanisms are involved, such as viral disorders and drug hypersensitivity.

Fig. 3.16 Conjunctival follicles are collections of lymphoid tissue beneath the epithelium. In this example of follicular conjunctivitis there is a central nodule containing lymphocytes in a swollen conjunctiva. The epithelium has also undergone some squamous metaplasia due to the presence of chronic inflammation.
Fig. 3.17 Pseudomembrane formation on the surface of the conjunctiva is seen in cases of severe acute conjunctivitis. A fibrinous exudate forms which is initially loosely adherent to the underlying tissues from which the pseudomembrane may be separated without causing bleeding from the surface. A true membrane is firmly adherent to the conjunctival epithelium and attempted removal gives rise to a bleeding conjunctival surface. Subsequent organization of the membrane produces scar tissue.

Fig. 3.18 Conjunctival scarring maybe the end result of a wide variety of inflammatory processes and its effects on the eye vary from insignificant to devastating depending on its effects on the tear film and lid architecture. Localized superficial linear scarring may have little clinical significance, as in this example which followed a severe viral conjunctivitis.

Fig. 3.19 Extensive diffuse scarring resulting from trachoma may have serious effects on the eye by diminishing the protective functions of the lids and conjunctiva. Contraction of the scar may result in entropion, trichiasis and lid shortening. Obliteration of the normal mucus secreting cells may affect the stability of the tear film. This example also shows some fibrovascular proliferation in the superficial scar tissue which may subsequently add to the already extensive scar by further fibrosis (see also Chapter 4).

Fig. 3.20 Symblepharon is an adhesion between the conjunctiva covering the lids and the globe. In this example, severe conjunctival adhesions developed following a lime burn. Disorders of ocular motility and poor lid closure with corneal exposure or instability of the tear film may result.
Fig. 3.21 Squamous metaplasia of the conjunctiva can be recognized clinically by altered wetting characteristics of the affected conjunctiva. Such changes usually arise as a result of prolonged chronic inflammation and eventually lead to keratinization which may cause further damage in an already compromised cornea.

Fig. 3.22 Concretions are minute hard yellow spots seen in the palpebral conjunctiva of elderly people, although they may also be the result of chronic inflammatory disease. They rarely cause symptoms but, if large, they occasionally project through the surface of the conjunctiva to produce a foreign body sensation and will stain with bengal rose or fluorescein. If necessary, they may be removed using a needle point under topical anaesthesia. They are formed by cellular degeneration when the debris remains trapped in small recesses of the conjunctiva and becomes calcified.

Fig. 3.23 Conjunctival retention cysts are common and usually develop in the accessory lacrimal glands of Krause. These are thinwalled cysts filled with clear watery fluid and usually do not cause any symptoms. If large, they may be ruptured or excised.

**DRUG INDUCED CONJUNCTIVAL CHANGES**

Normal conjunctiva and cornea can undergo toxic changes in response to topical or systemic drugs or other chemicals in the absence of any immunological changes. Topical antibiotics or antiviral drugs often interfere with normal cellular metabolism if given for prolonged periods; in the cornea this is seen as a superficial punctate epithelial keratopathy or poor epithelial healing and in the conjunctiva as a papillary reaction, keratinization or punctal stenosis. Preservatives in eye drops frequ
Epinephrine drops, used in the treatment of glaucoma, undergoes oxidation when trapped in pre-existing conjunctival pockets, concretions, or cysts resulting in discrete 'granules' which usually cause no symptoms.

A follicular conjunctivitis, presumably with an underlying immunological basis, can also be induced by topical medication.

Topical preparations may produce a nonspecific response, as in this case of a thiomersal-induced conjunctival reaction. Such preservatives, which are common to many preparations, especially solutions for soft contact lens use, may produce a marked hyperaemia of the vessels associated with a fine papillary reaction. Reversal of the changes over a period of several weeks occurs when the patient is changed to treatment with a preservative-free solution.

Argyrosis of the conjunctiva and cornea is due to the deposition of silver which used to result from the long term topical use of silver-containing therapeutic preparations. The conjunctiva develops slate-grey areas of pigmentation which is seen here most clearly in the caruncle. Silver deposition in the cornea appears as a broad greyish band affecting Descemet's membrane in the periphery.
This patient has developed squamous metaplasia of the conjunctival surface near the lid margin, following prolonged idoxuridine therapy. A thick, white, keratin plaque is present with the normal conjunctival mucous membrane replaced by stratified squamous epithelium, which has obliterated the meibomian orifices along the lower lid margin.

Dyskeratotic changes are seen over the whole of the lower fornix and tarsus with extension on to the bulbar conjunctiva on the medial side in this unusual example where pilocarpine and neutral epinephrine drops had been used over many years. Keratin sheet formation is seen as a whitish, non-wetting surface in the areas of conjunctiva which might be expected to have most contact with the drug. The lower punctum appears to have been completely obliterated and the remaining visible conjunctiva is hyperaemic.

Chemical Burns

Acid burns coagulate the superficial proteins of the conjunctiva and cornea; they do not penetrate the eye and so tend to cause only superficial scarring. In contrast, alkalis saponify the lipids and rapidly penetrate the eye producing devastating damage both to blood vessels and intraocular structures within minutes of contact. First aid measures, especially prompt immersion of the eye in cold water, to dilute and remove the chemical, are vital in reducing damage. Alkali burns are followed by collagenase secretion from the perilimbal conjunctiva in the recovery phases which can produce corneal melting. This is compounded by destruction of the accessory lacrimal glands and goblet cells in the conjunctiva producing tear film abnormalities.

This patient shows acute changes in the skin and outer eye immediately after an ammonia burn. There are large sloughing areas with erythema of the skin of the upper and lower eyelids. The conjunctiva is chemotic and haemorrhagic and there is loss of corneal epithelium over the lower half of the cornea.
Fig. 3.30 This is the appearance of the bulbar conjunctiva immediately following a severe alkali burn, and shows the typical appearance with complete absence of the normal conjunctival vascular markings in a dense white, slightly chemotic conjunctiva. There is complete loss of the whole corneal epithelium and early sloughing of necrotic conjunctiva beneath the upper tarsus. By courtesy of Mr RJ Buckley, Moorfields Eye Hospital, London, UK.

Fig. 3.31 In the same patient as Fig. 3.30, conjunctival necrosis occurred some weeks after the ammonia burn. The whole upper tarsal conjunctiva is pale, yellowish and swollen, with poorly defined vessels. The upper edge is starting to slough away from the underlying tissues. Healing will occur with fibrosis of the lid leading to cicatricial entropion and further corneal damage. By courtesy of Mr RJ Buckley, Moorfields Eye Hospital, London, UK.

Fig. 3.32 The late corneal changes of the same patient are shown six weeks later. The corneal stroma has become oedematous and is undergoing melting, as evidenced by the ectatic shape. There is failure of epithelization over the central part of the cornea. These eyes heal with dysplastic epithelium, derived from the limbal conjunctiva, covering the cornea. Visual recovery can be helped in appropriate patients by excising the affected tissue and regrafting the limbus with healthy conjunctiva from the fellow eye. By courtesy of Mr RJ Buckley, Moorfields Eye Hospital, London, UK.
Fig. 3.33 Healing of the corneal tissues may eventually take place in the presence of massive neovascularization of the cornea. There is diffuse stromal scarring associated with thinning and facetting of the cornea. The corneal problems are usually compounded by abnormalities in the tear film from the conjunctival damage; this, together with the neovascularization, produces an extremely poor prognosis for corneal grafting. By courtesy of Dr AHS Rahi, Moorfields Eye Hospital, London, UK.

**NON-PIGMENTED TUMOURS OF THE CONJUNCTIVA**

Tumours of the conjunctiva occur infrequently and may give rise to problems in diagnosis at the time of their presentation. The clinical differentiation between hypertrophic and neoplastic processes, and benign and malignant conditions may be extremely difficult on the basis of a single examination.

Repeated observations over a period of time with the aid of serial photographs may be helpful in determining the evolution of the lesions and in many cases a biopsy will be required to make a tissue diagnosis.

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<th>Tissue of Origin</th>
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<th>Malignant</th>
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<td>naevus</td>
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Fig. 3.34 Tumours may be classified, according to their tissue of origin, into those arising from the surface epithelium (or its associated glandular elements), connective tissue, vascular, lymphoid tissue or peripheral nerves. Pigmented lesions of the conjunctiva are an important group of conditions which are considered in detail separately.
Fig. 3.35 Dyskeratosis is a term that encompasses a variety of pathological changes taking place within the corneal and conjunctival epithelium and which may present clinically as a dry white plaque on the surface of the globe (leucoplakia). The disease may arise as a result of a variety of chronic irritative factors such as solar radiation (actinic keratosis) and topical drug therapy. In this unusual example dyskeratosis followed prolonged miotic therapy in a case of aphakic glaucoma. The dry, keratinized white plaque shows clearly against the chronically inflamed conjunctiva, which has taken up fluorescein stain.

Fig. 3.36 Some of the histological features of dyskeratosis are shown in this example where epithelial hyperplasia is associated with excessive keratin formation. There is underlying elastotic degeneration and, in this case, a chronic inflammatory reaction is present as indicated by the lymphocytes in the subepithelial layers. It is not uncommon for dyskeratotic lesions to undergo malignant change and produce an invasive squamous carcinoma. Such lesions should therefore be excised if there is any suspicion of malignancy.

Fig. 3.37 Papillomata arising in the conjunctiva may be either sessile or pedunculated lesions with a slightly irregular surface. They occur most commonly in patients over forty years of age either at the caruncle or in the fornices. They may occasionally be multiple. This is an example of a sessile papilloma on the bulbar conjunctiva. Treatment is by excision, and should, where possible, include an area of healthy conjunctiva around the base.
Fig. 3.38 The histology in this example shows papillary proliferation of nonkeratinizing squamous epithelium around a central fibrovascular stalk. Goblet cells are present within the proliferating epithelium and the stroma includes a chronic inflammatory cell component which is consistent with the viral origin of such proliferations.

Fig. 3.39 Pseudoepitheliomatous hyperplasia of the conjunctiva is a benign reactive proliferation of the epithelium in the presence of inflammation. In this example, the patient had noticed the appearance of an irregular nodule during the preceding eight weeks associated with a red eye. The causes of this type of lesion in the conjunctiva are unknown, but in the skin the condition has been reported following an insect bite or as a reaction to drugs. It may also be observed histologically in relation to neoplastic lesions. Treatment is by excision.

Fig. 3.40 Bowen's disease or carcinoma in situ of the conjunctiva is, by definition, a carcinoma whose growth is by lateral extension within the epithelium without invasion of the underlying tissue. It usually occurs in elderly males appearing as an elevated mass arising from the epithelium which may be accompanied by an inflammatory reaction in the surrounding conjunctiva. Bowen's disease should be treated by local excision and a striking feature of corneal involvement is the ease with which the lesion is stripped from Bowman's membrane.

Fig. 3.41 The histological features of Bowen's disease are a proliferation of the basal cells of the epithelium, with partial loss of their normal polarity and hence their regular palisades. The nuclei are hyperchromatic and mitotic figures are common. The basement membrane is intact and extension is entirely intraepithelial by lateral growth.
Fig. 3.42 Squamous cell carcinoma (epithelioma) of the conjunctiva is a relatively rare condition which develops most commonly at the limbus in the interpalpebral zone. It starts as a small grey nodule which, as in this example, becomes almond-shaped as it extends around the limbus. Large feeder vessels have developed which, when associated with tumours of the eye, should always give rise to the suspicion of malignancy. In its early stages, such a lesion may be treated by wide local excision but recurrences are common.

Fig. 3.43 A more advanced case of squamous cell carcinoma with extensive progression around the limbus and invasion onto the cornea is shown here. Note the prominent feeding vessel.

Fig. 3.44 Histology of a moderately well differentiated squamous carcinoma with keratin formation on its surface. In contrast to papilloma, there is marked pleomorphism of the basal cells which have broken through the basement membrane into the underlying tissues.

Fig. 3.45 Dermoid cysts are congenital tumours involving tissue of mesodermal and ectodermal origin. They appear as raised circumscribed pale yellowish growths and are generally situated at the lower temporal limbus where they involve the cornea, conjunctiva and sclera. They are normally present at birth and although enlargement is unusual, removal may be justified on cosmetic grounds when the child is nearing school age. If the deeper layers of the cornea are involved, a lamellar keratoplasty may be required to restore corneal thickness and reduce astigmatism.
Fig. 3.46 Children with dermoid cysts should be examined for other signs of Goldenhar's syndrome (first branchial arch syndrome) - accessory auricles, limbal and orbital dermoids, sometimes with maldevelopment of the jaw.

Fig. 3.47 Orbital dermolipomas may occur as part of Goldenhar's syndrome or in isolation.

Fig. 3.48 The histology of a limbal dermoid shows it to consist of abundant collagen with a surface covering of stratified squamous epithelium. A variety of tissues may be present within the collagen matrix, as in this example where islands of sweat gland ducts and a hair follicle are visible.

Fig. 3.49 This example of a small haemangioma of the conjunctiva had been present for many years with no alteration in size. The dilated blood vessels reflect the vascular nature of the lesion and should be distinguished from enlarged feeding vessels associated with malignant tumours.

Fig. 3.50 The histology of a similar capillary angioma is shown in this illustration. There is focal proliferation of blood vessels lined by normal endothelial cells. The overlying conjunctival epithelium is thinned.
Fig. 3.53 This is an example of a reactive lymphoid hyperplasia and is not a true neoplasm although this distinction cannot be made clinically. The lesion presents as a slowly growing, diffuse mass involving the bulbar conjunctiva and the fornices. There are no inflammatory changes in the unaffected conjunctiva which appears normal and the condition should not therefore be confused with lymphoid follicles seen in cases of conjunctivitis.

Fig. 3.51 Kaposi's sarcoma is a highly malignant tumour thought to be of endothelial cell origin. It has hitherto been considered a rarity but has achieved greater prominence since the advent of AIDS. Mucous membrane involvement, as in this example in the conjunctiva, is usually a later manifestation of the condition. However, up to 18% of patients with Kaposi's sarcoma show conjunctival involvement. The lesions appear as bright red or purplish masses and haemorrhages are frequently present within the tumour reflecting the highly vascular nature of the condition. They are radiosensitive and can therefore be treated by radiotherapy if they become large and bulky. By courtesy of Mr Bruce Mathalone.

Fig. 3.52 This high-power view of a Kaposi sarcoma shows the typical features of uniform spindle cells interspersed with numerous erythrocytes in sinusoidal spaces. By courtesy of Dr PH McKee.

Fig. 3.54 In histological section, a mixture of lymphoblasts (with paler staining nuclei) and lymphocytes (with darker nuclei) can be seen. No mitotic figures are visible and the surface of the lesion is covered by a thinner epithelium. The histology of this condition may sometimes be difficult to distinguish from a well differentiated, malignant lymphoma. In such cases the use of monoclonal antibodies is helpful. If the cell population is polyclonal, that is a mixed population of B and T cells, the tumour is likely to prove benign whereas a monoclonal pattern usually indicates malignancy and an assessment for a systemic lymphoma is required. However polyclonal lesions may become lymphomatous with time.
The melanocytes of the conjunctiva are derived from the neural crest in the same way as those of the skin or uveal tract. A wide variety of pigmented conjunctival lesions are seen clinically. They can be difficult to diagnose and have varying degrees of malignant potential. Conjunctival freckles and naevi are usually thought of as congenital lesions, although they are frequently not apparent at birth, and tend to become larger and more pigmented with age. Junctional and compound conjunctival naevi have a low malignant potential: cutaneous malignant melanomas have an incidence of 30 per 100,000 population, but the average person has approximately 24 cutaneous naevi. About 60% of conjunctival melanomas arise in a naevus or in an area of acquired conjunctival melanosis. Uveal tract melanomas are classified differently to conjunctival naevi and according to cell type (see Chapter 9).

**Fig. 3.55** A classification of pigmented lesions of the conjunctiva.

**MELANOSIS**

Congenital melanosis is common in Negro eyes. It may be either epithelial (where it appears as localized pigment flecks in the bulbar conjunctiva) or subepithelial (where it is diffuse and may be associated with the cutaneous naevus of Ota). This is a diffuse unilateral slate-grey discolouration seen on the lids and face which has the histological features of a blue naevus. Neither form has been shown to have any tendency towards malignant change in the conjunctiva but patients with a naevus of Ota have an increased risk of developing a melanoma of the uveal tract.

Acquired melanosis may be due to a variety of causes such as exposure or drugs, but primary acquired melanosis of the conjunctiva carries a high risk of the patient developing multiple malignant melanomas. Although malignant melanomas of the conjunctiva will invade locally and metastasize to the regional lymph glands, their growth tends to be slow and small lesions do well with local treatment, especially cryotherapy.

**Fig. 3.56** Naevus of Ota. This example of congenital subepithelial melanosis shows a large bluish-grey area of pigmentation extending up to the limbus. The edge of the lesion is slightly mottled and the very dark iris indicates associated melanosis oculi which may sometimes accompany the condition and carries a higher than normal risk of developing choroidal malignant melanoma. For this reason, patients should be observed periodically.

**Fig. 3.57** Acquired melanosis associated with longstanding conjunctival disease is shown in this case of ectropion in a black patient. Similar pronounced pigmentary changes may be seen in the conjunctiva of patients with trachoma or onchocerciasis and probably reflect a high rate of conjunctival epithelial turnover associated with chronic disease. Acquired melanosis in Caucasian individuals is of far greater significance where it may represent a premalignant condition. Histologically acquired melanosis has the appearance of a junctional naevus.
Fig. 3.58 Benign naevi, although embryonic in origin, are not always present at birth and in many cases they may not become apparent until adulthood. They are common lesions and their usual site is at the limbus, as this example where the pigmented area contrasts markedly with the white sclera. They tend to grow slowly but, providing they do not undergo rapid change, develop feeder vessels or become raised, no treatment is required.

Fig. 3.59 There is no junctional activity in this conjunctival intradermal melanocytic naevus. The dermis is expanded by a uniform population of melanocytes. In the centre of the field abundant melanin pigment is present. By courtesy of Dr PH McKee.

Fig. 3.60 This child has a congenital naevus involving the conjunctiva, caruncle and eyelids. (Note the full thickness skin graft medially to the upper and lower lids.)
Fig. 3.61 In this conjunctival congenital intradermal melanocytic naevus, there is a densely pigmented spindle cell dendritic blue naevus component. Note the intradermal location and intense pigmentation. By courtesy of Dr PH McKee.

Fig. 3.62 Malignant melanomas of the conjunctiva may arise spontaneously, from a pre-existing naevus, or an area of precancerous melanosis. They occur with equal frequency in males and females most commonly between the ages of forty and sixty years. This is an example of a malignant melanoma arising at the limbus and spreading into the cornea. Many feeding blood vessels are visible. Localized lesions may be treated by excision of the affected conjunctiva with a wide margin of tissue.

Fig. 3.63 This photograph shows multiple malignant melanomas of the conjunctiva arising in areas of acquired precancerous melanosis. All Caucasian patients with acquired melanosis should be followed at regular intervals with serial photography. Pigmented areas which increase in size or thickness or develop feeding vessels should be excised and examined histologically for evidence of malignancy. Small lesions can be treated by cryotherapy. Histologically these lesions are similar to superficial spreading malignant melanomas of the skin.
Fig. 3.64 Malignant melanomas may spread by direct invasion or by seeding to other parts of the conjunctival sac. In this example, a melanoma on the upper tarsus has given rise to lesions at the lid margin (top) and at the upper limbus (bottom). In this instance exenteration of the orbit, including the eyelids, offers the only surgical way of removing all potential tumour bearing tissue.

Fig. 3.65 This gross example of a neglected malignant melanoma shows a fungating tumour which has arisen from the anterior part of the globe and spread onto the cheek. In spite of its size, there was no direct invasion of neighbouring orbital or facial structures and no evidence of distant metastases.

Fig. 3.66 This specimen, removed by limited extereation, shows the position and extent of a malignant melanoma in macroscopic section. A large conjunctival melanoma is visible occupying over one-third of the anterior surface of the globe in the section shown. No invasion of the globe has taken place.
Fig. 3.67 A high-powered histological section of a malignant melanoma of the conjunctiva shows large numbers of tumour cells with densely staining nuclei, some of which can be seen invading the necrotic epithelium. Many mitotic figures are present. Macrophages, containing abundant melanin pigment granules are prominent, together with many blood vessels.
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