

Introduction

Orbital fat is located within one of two compartments or spaces: extraconal or intraconal.^{1,2} Extraconal orbital fat lies outside the extraocular muscles and is limited by the orbital septum and the orbital periosteum externally.³ Intraconal orbital fat lies within the extraocular muscle cone and is enclosed by Tenon's capsule internally and extraocular muscle externally.^{1,4} Prolapse of extraconal fat is a common occurrence presenting clinically as excess fat within the upper and lower eyelids.^{1,5,6} With aging, the orbital septum becomes thinner and weaker, the extraconal fat herniates, causing protruding palpebral bags or festoons.^{1,7} This typically occurs in patients aged 60 or older.¹

Intraconal fat prolapse is characterized by herniation of orbital fat to the epibulbar subconjunctival space because of dehiscence of Tenon's capsule.^{6,8} It is a much more rare occurrence and is attributed to ocular surgery, trauma, thyroid dysfunction, cutis laxa (generalized elastosis) or aging.^{2,3,6,9} It is most often seen in obese males with a mean age of 65-72 years (range, 28-94 years).^{5,10} Clinically, subconjunctival orbital fat presents as a soft, mobile, non-tender yellowish mass, most frequently located in the superotemporal quadrant.^{11,12} Its anterior margin is typically convex and superficial blood vessels are readily visible.⁹ It is usually bilateral, but may also be unilateral. As the extension of prolapsed fat is often asymmetric, smaller lesions in the contralateral eye may be sometimes overlooked.¹³ The mass can be increased in size with manual retropulsion of the globe.⁸

These lesions are usually asymptomatic but on occasion the patients may experience discomfort, dry eyes or even corneal dellen if the lesion is large enough.^{1,12,14} Most patients, whether symptomatic or not, usually present with cosmetic concerns or anxiety over the possibility of the lesion being malignant.

Subconjunctival orbital fat prolapse is a benign lesion, although it can resemble other ocular conditions such as conjunctival dermolipoma, pleomorphic lipoma, atypical lipomatous tumor, conjunctival lymphoma, dermoid cyst and lacrimal gland prolapse.^{1,5,8,15}

Differentiation between these lesions requires a detailed examination which may include computed tomography (CT) or magnetic resonance imaging (MRI) and histopathologic analysis of the biopsy specimen.^{2,5,15,16}

Management of these lesions can include simple observation or surgical excision through a transconjunctival incision.¹¹

Case Report

A 79-year-old male was referred by his optometrist for evaluation of a lesion protruding from the left bulbar conjunctiva. The patient noted that he has had this lesion for eight months. He called it a "funny area" and a "yellow spot" that was not painful and did not affect his vision. He denied any accompanying headache, diplopia or any other ocular symptoms. When he originally saw his optometrist for this lesion, he did have the complaint of "crusting of his lashes" in his left eye only. His optometrist diagnosed him with bacterial conjunctivitis of the left eye and treated him with ofloxacin 0.3% ophthalmic solution. The crusting on his eyelashes cleared up shortly after initiating this treatment. It has not recurred over the last three months since his last visit to the optometrist.

The patient was currently not using any eye drop medication. His ocular history was otherwise unremarkable as was his family ocular history. His medical history was positive for mildly elevated cholesterol levels that he was trying to control with diet. He had no known drug allergies.

His best corrected visual acuity was 20/20 in the right eye and 20/25 in the left eye. Pupils were round, regular and reactive with no afferent pupillary defect. Muscle balance indicated orthophoria at distance and near and extraocular muscle motility was full without restrictions. His intraocular pressures were 14mmHg right eye and 12mmHg left eye.

External evaluation indicated bilateral lower eyelid and malar festoons (puffy lower eyelids with drooping). There was also a yellowish orbital mass with a smooth convex surface which protruded from the superotemporal quadrant in the left eye (Figure 1).



Figure 1: Yellow-colored mass with prominent superficial blood vessels protruding from the superotemporal quadrant.

The mass felt soft with palpation, was non-tender to touch and it was easily repositioned posteriorly into the orbit using a cotton-tip applicator. Retropulsion of the globe pushed the mass anteriorly, making it more prominent. Based on these characteristics, the tentative diagnosis of subconjunctival orbital fat prolapse was made.

A slit-lamp examination identified small fine blood vessels on the conjunctival surface overlying the mass and similar small fine blood vessels on the surface of the mass itself. There was no erythema, edema or discharge. His corneas were clear. He had a deep and quiet anterior chamber and early nuclear sclerotic cataracts in both eyes.

A dilated fundus exam showed normal optic nerves. Both maculas showed mild glistening epiretinal membranes but no drusen or edema. The rest of the fundus exam was unremarkable.

Management

The patient was presented with the options of either observation or excision of the orbital mass. He did not like its appearance and wanted to make sure it was not malignant. He gave his consent for the procedure to be performed.

The patient was scheduled for surgery under monitored conscious sedation. In the operative suite, he was placed in a supine position and topical tetracaine 0.5% anesthetic and povidone iodine 5% were applied to his left lower cul-de-sac. The surrounding skin of the eyelids and lateral canthus was sterilely prepped and draped. A manual speculum was positioned to open the left eye maximally. An injection of xylocaine 1% with 1:100,000 epinephrine, 2ml, was injected directly into the mass to provide local anesthesia. A transconjunctival incision was made with Westcott scissors directly over the mass. A hand-over-hand technique was used to advance the orbital fat (Figure 2).

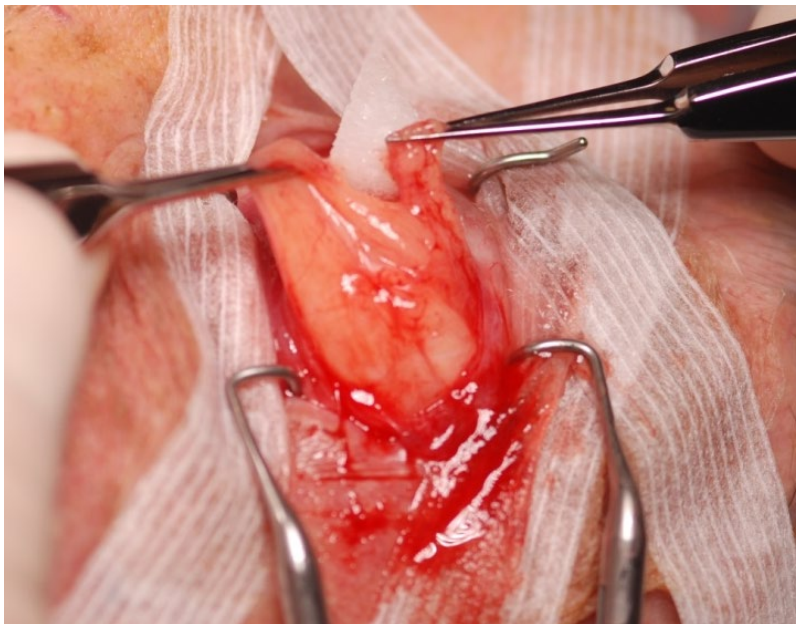


Figure 2: Intraoperative exposure of intraconal fat protruding through a transconjunctival incision.

When sufficient tension was noted, a curved hemostat was placed on the fat and the excess fat was excised. This excised specimen was sent to the pathology laboratory for histopathologic analysis. The ends of the individual fat lobules that were still being held with the hemostat were cauterized to prevent hemorrhaging. The hemostat was removed and the residual fat retracted into the orbit. No retrobulbar

bleeding was noted. Therefore, both Tenon's capsule and conjunctival tissue were grasped with forceps and reapproximated using fibrin glue (Figure 3).

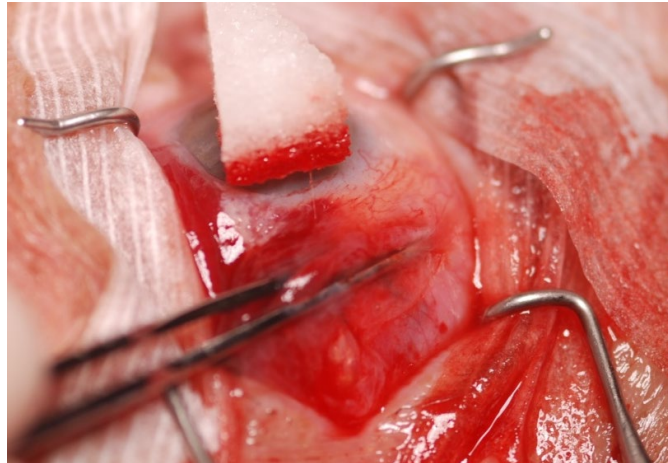


Figure 3: Tissue being grasped with forceps to allow fibrin glue to seal the incision.

The eye was treated with ciprofloxacin 0.3% ophthalmic ointment. The eyelid speculum was removed and the patient was instructed to continue using the ciprofloxacin ointment twice a day for ten days.

On follow-up one week after surgery, the patient felt his eye was doing well. Examination of the surgical site indicated it was healing well and there was minimal hyperemia and edema. No drainage or residual fat protrusion was noted (Figure 4).



Figure 4: One week post-operatively, incision healing well with no evidence of protruding orbital fat or infection.

If an optometrist is seeing this patient post-operatively, initially the patient should be monitored for any signs of infection and making sure the incisions are healing well. Long-term, annual evaluation should include examination for any evidence of recurrence of orbital fat prolapse.

Histopathology

The biopsy specimen was found to contain uniform, loosely adherent lobules of mature adipocytes separated by fibrovascular septae. There were no hyperchromatic cells within the septae, only normochromatic fibroblastic cells within normal collagen (Figure 5).

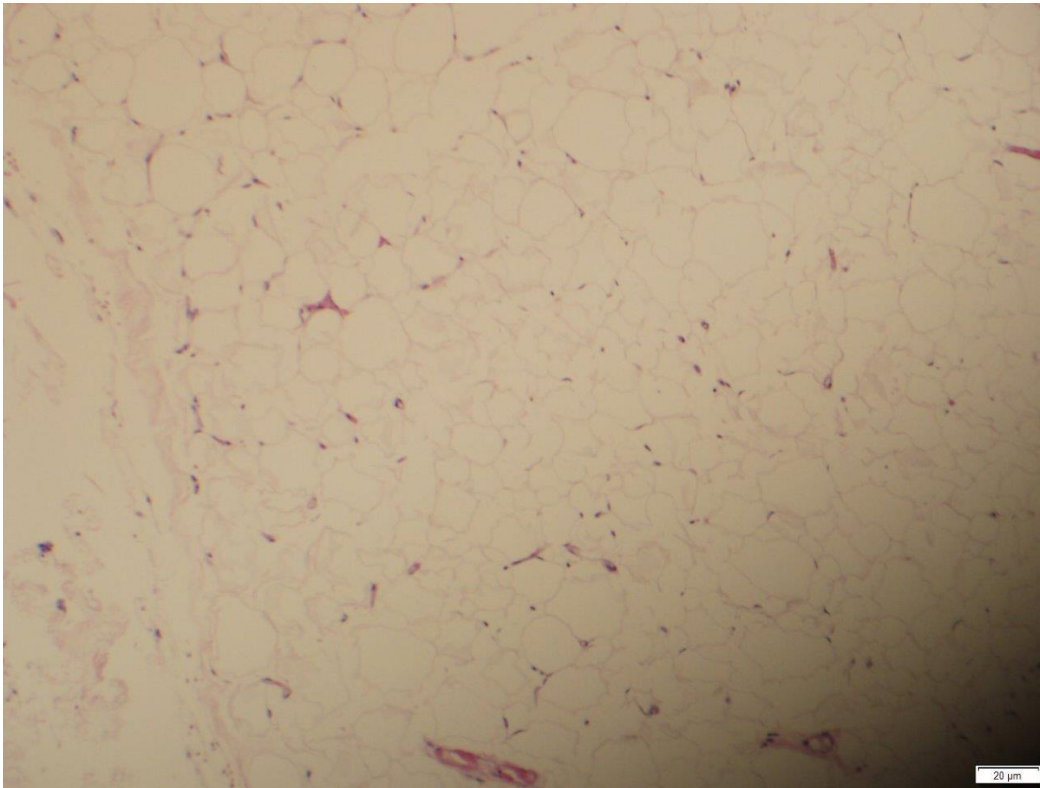


Figure 5: Photomicrograph of intraconal orbital fat. Mature adipocytes separated by fibrovascular septae.

Lochkern cells were found to be spaced intermittently within the biopsy specimen. These cells display enlarged nuclei with intranuclear vacuoles (Figure 6).

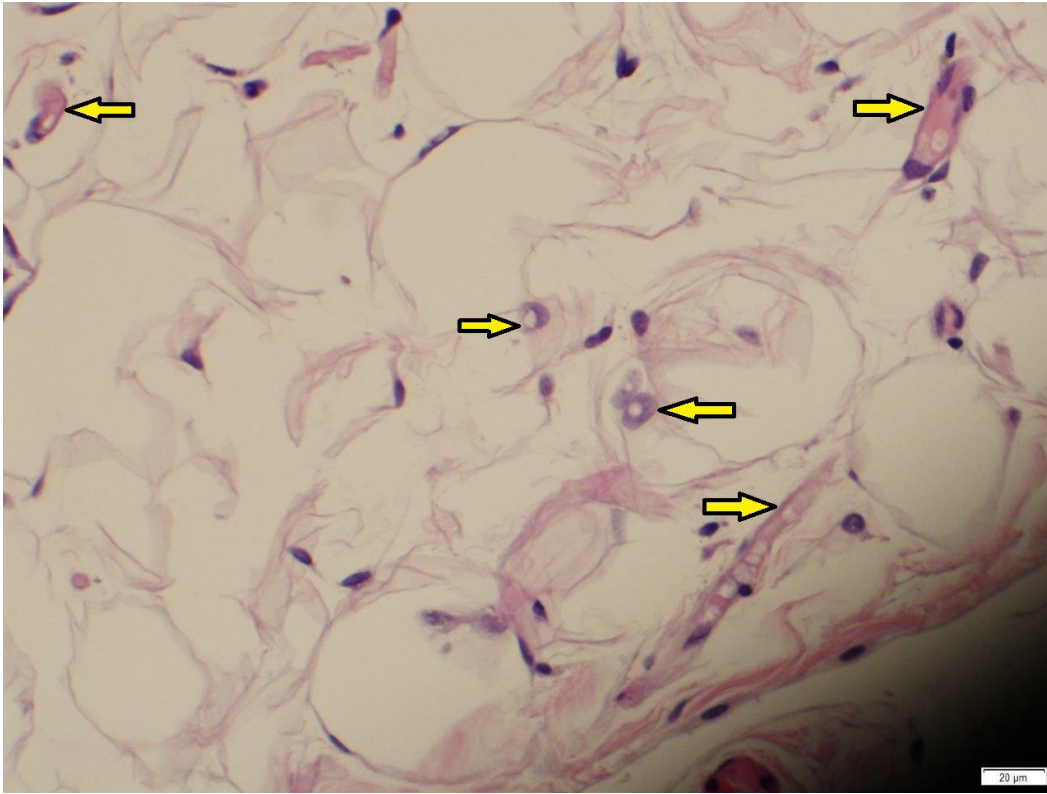


Figure 6: Photomicrograph showing adipocytes containing intranuclear vacuoles (Lochkern cells) (arrows).

Also present in the specimen were multinucleated giant cells known as floret-like giant cells. These are wreath-like presenting normochromatic nuclei that can be seen within or adjacent to the fibrovascular septae (Figure 7).

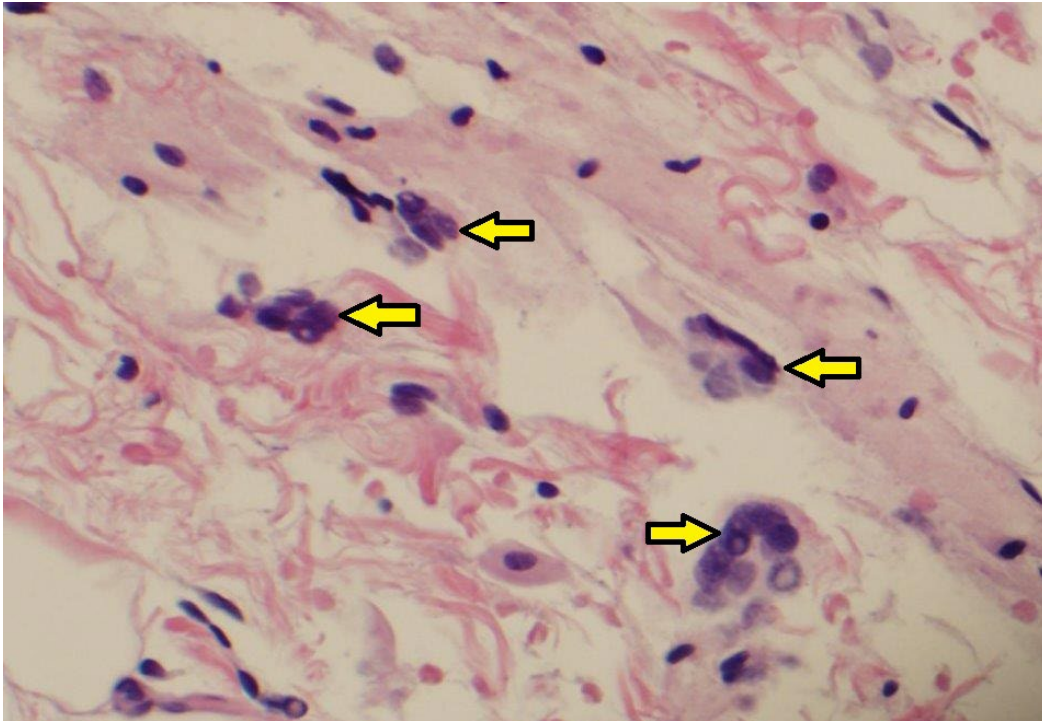


Figure 7: Photomicrograph showing multinucleated floret-like giant cells with a wreath-like pattern of uniform, small normochromatic nuclei (arrows).

Other cells that may be seen frequently in intraconal fat are histiocytes, lymphocytes, plasma cells and mast cells. Benign lipomatous neoplasms such as protruding yet normal intraconal fat, consist of mature monotonous adipocytes. Malignant lipomatous neoplasms are composed of more pleomorphic, hyperchromatic adipocytes with mitoses, lipoblasts or abnormal vasculature.³

Discussion

Subconjunctival orbital fat prolapse is a rare cause of an intraorbital mass. There is a 2% coincidence among orbital tumors and similar lesions that present as a yellowish mobile mass located beneath the conjunctiva.¹⁷ The most common lesions of the orbit and conjunctiva that may mimic subconjunctival orbital fat prolapse include lacrimal gland prolapse, conjunctival dermolipoma, dermoid cyst, conjunctival lymphoma, pleomorphic lipoma and atypical lipomatous tumor (Table).^{1,5,8,15}

Lacrimal gland prolapse needs to be differentiated from subconjunctival orbital fat prolapse since both, upon direct visualization, occur in the superotemporal quadrant and can cause temporal fullness at the orbit.¹ Prolapse of the lacrimal

gland presents as a whitish-pink mass making the eyelid edematous or baggy in appearance.¹ This tissue is more firm and dense with palpation and unmovable compared to prolapsed fat.¹ The upper eyelid typically must be everted to reveal the underlying prolapsed lacrimal gland.² Prolapsed orbital fat is yellow or light yellow, soft and typically seen without eyelid eversion.^{1,2,5}

A dermoid cyst is a developmental choristoma (conjunctival cyst) and is found in the superotemporal or superonasal quadrants.¹⁸ These cystic lesions are lined with epithelium and filled with keratinized material.¹⁸ Although superficial dermoid cysts present in early infancy, deep dermoid cysts are seen in both children and adults.¹⁹ They can be attached to any bony suture in the orbit and may extend across bones into the frontal sinus, temporal fossa or cranium.¹⁹ They present clinically as a firm, minimally mobile, slowly enlarging, painless, subcutaneous mass.^{19,20}

Another choristoma is dermolipoma which is also located in the superotemporal conjunctiva, often with extension posteriorly into the orbit.²¹ This congenital lesion is pinkish-white or pinkish-yellow, firm and fixed to the globe, is unaffected by retropulsion of the globe, cannot be repositioned into the orbit, has a straight or only slightly convex border and often exhibits growth of fine hairs on its surface.¹⁵ Occasionally it can be atypical and even pedunculated.²² Histopathologically, these lesions show squamous epithelium-lined tissue containing mature adipose tissue in addition to bundles of dense collagen and adnexal structures.³ All of these characteristics stand in contrast with those of subconjunctival orbital fat prolapse. When there may be uncertainty, CT or MRI can be used for differential diagnosis.^{8,15}

The concern from the patient was to rule out a cancerous lesion. A lymphoproliferative tumor or conjunctival lymphoma may also mimic subconjunctival orbital fat prolapse. Clinically, a lymphoma tumor is usually diffuse, firm, non-mobile, slightly elevated fleshy-pink mass that has a sliced-salmon appearance (Figure 8).²³

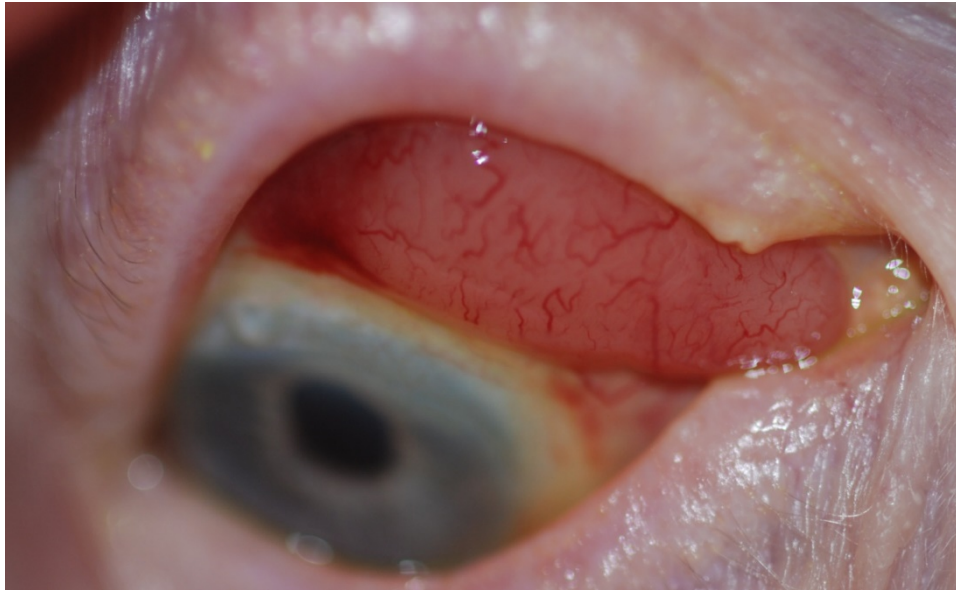


Figure 8. Sliced-salmon appearance of conjunctival tumor in patient with lymphoma.

Histopathologically, a lymphoid tumor is composed of solid sheets of atypical lymphocytes.²³

Finally, both pleomorphic lipoma and atypical lipomatous neoplasms may resemble subconjunctival orbital fat prolapse since both under histologic evaluation can contain multinucleated foamy-like giant cells, fibrous septae and Lochkern cells.⁵ However, emphasis needs to be placed on subtle differentiating characteristics. Pleomorphic lipomas contain aggregates of bland spindle cells associated with "wire-like" collagen, whereas atypical lipomatous neoplasms display enlarged hyperchromatic cells within fibrous septae.^{5,8,16} These findings are completely absent in prolapsed orbital fat and were absent in the patient documented in this case report.^{5,8,16}

A variety of different surgical procedures have been described to repair subconjunctival orbital fat prolapse. A number include resection or repositioning of the prolapsed fat and suturing the transconjunctival incision.^{11,24-26} Some of these techniques have resulted in a full-thickness perforation of the sclera, leading to intraocular hemorrhage and rhegmatogenous retinal detachment.²⁵ I personally have done a number of these cases as a sutureless repair since conjunctival mucosal tissue is self-healing and not using any needles and sutures avoids scleral perforation.² Fibrin glue can also be used to close these incisions therefore avoiding any injury to the globe from needles and sutures.²⁷ Fibrin glue was used in the patient in this case report to help secure the surgical incision.

Conclusion

Subconjunctival orbital fat prolapse is a benign entity that can mimic several other orbital pathologies. Even though most patients are asymptomatic, they usually want these lesions removed because of cosmetic concerns and they seek counseling to regards to the differential for a cancerous lesion. Surgical repair includes transconjunctival excision of the prolapsed fat as its recurrence rates are very low.^{5,11} Histopathologic analysis of the excised lesion is essential to rule-out any potential malignancy.

MASS	COLOR	APPEARANCE	PALPATION
Prolapsed Orbital Fat	Yellow or light yellow	Convex with superficial blood vessels	Soft; freely moveable
Lacrimal Gland Prolapse	Whitish-pink	Eyelid edematous or baggy	Firm and dense; unmovable
Dermoid Cyst	Color of lesion not seen since deep to skin surface	Convex protrusion under skin	Firm; minimally moveable
Dermolipoma	Pinkish-white or pinkish-yellow	Straight or only slightly convex; fine hairs on surface	Firm and fixed to globe
Conjunctival Lymphoma	Fleshy-pink "sliced-salmon" appearance	Elevated and diffuse	Firm, non-mobile

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