Fig. 5.—Sjögren's syndrome with swollen parotid glands, dry mouth, and arthritis.

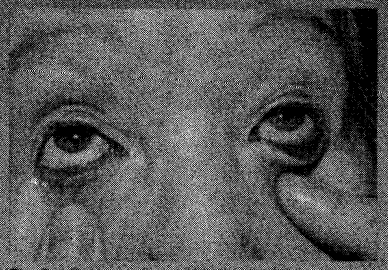


Fig. 6.—Conjunctivitis and blepharitis due to a lack of tears.

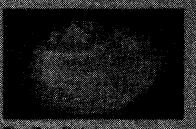
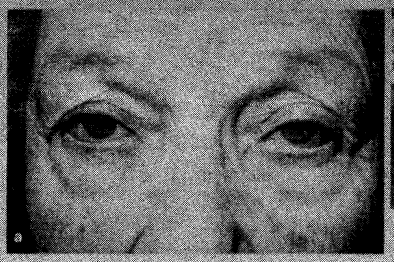


Fig. 7.—Debris and mucous threads in the inferior fornix.



Figs. 8 a,b.—Rose-bengal staining of the conjunctiva and cornea, a diagnostic test for dry eye.

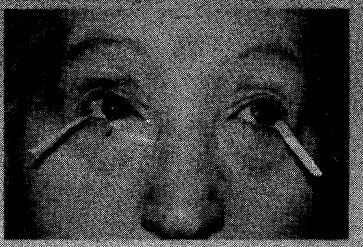


Fig. 9.—Diminished lacrimation is demonstrated by using filter paper to demonstrate wetting, ie, Schirmer's test.

persists, the superficial epithelial layers will erode with ensuing corneal ulceration (Fig. 2). Among the conditions that can scar the conjunctiva and thereby create a secondary deficiency of mucus are the Stevens-Johnson syndrome (Figs. 3,4), toxic epidermal necrolysis, benign mucous-membrane pemphigoid, avitaminosis A, trachoma, chemical burn, and the postvaccinial syndrome.

Lacrimal fluid deficiency. The most common cause of the dry-eye syndrome is an underproduction or absence of the middle watery layer comprising the lacrimal fluid. The ocular abnormality may be primary; however, most affected patients have associated systemic disease. Sjögren's syndrome is the classic example (Fig. 5). Such patients suffer from dry mouth, arthritis and, in some cases, swelling of the parotid glands. Other disorders linked to the dry-eye syndrome include rheumatoid arthritis, osteoarthritis, sarcoidosis, psoriatic arthritis, systemic lupus erythematosus, scleroderma, polyarteritis nodosa, and familial dysautonomia (Riley-Day syndrome).

The patient with a lacrimal-fluid deficiency usually has bilateral ocular disease manifested by erythematous eyelid margins (Fig. 6); a diminished or absent tear meniscus; debris in the precorneal tear film, ie, mucous threads in the inferior fornix and beneath the upper eyelid (Fig. 7); superficial punctate erosions of the cornea and conjunctiva demonstrable upon rose-bengal staining (Figs. 8 a,b); and the appearance of epithelial filaments on the cornea.

Schirmer's test. A common diagnostic procedure for detecting dry-eye disorders is Schirmer's test (Fig. 9) in which a strip of folded filter paper standard for this test is inserted behind the outer third of the lower eyelid with approximately 25 mm of the strip protruding downward. The patient may keep the eyes open during this 5-minute procedure. If at that time less than 10 mm of the free end of the strip is wet, a deficiency of lacrimation is indicated.

Oily-layer deficiency. A rare cause of dry eye is a deficiency of the oily layer of the tear film. Such deficiency may result from the atrophy of the meibomian glands following—for example—irradiation of the eyelids.

Loss of anatomic integrity. The normal tear film can also be disrupted by a poor approximation of the eyelids to the globe of the eye as is associated with either entropion or ectropion, and with defects and irregularities of the eyelid margins.