

#### Part 4: Anatomical Considerations

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**Stroma:** The stroma comprises approximately 90% of the corneal thickness. It consists of 200 to 250 layers of cells called lamellae, which lie parallel to the corneal surface. If damaged by injury, scarring will occur which can result in opacities of the cornea.

Chronic infection or corneal edema can cause blood vessels to invade the stroma resulting in a condition known as *neovascularization*. These blood vessels which enter to supply oxygen and nutrients can obscure vision.

**Descemet's Membrane:** A strong structureless layer which is secreted by the endothelium. It is elastic, and resistant to trauma and pathology.

**Endothelium:** The innermost or most posterior layer of the cornea, consisting of a single layer of flattened cells. In contrast to Descemet's Membrane, these cells are very susceptible to trauma and pathology. And in marked contrast to the epithelium, endothelium cells are infrequently, if ever replaced as a normal process during adult life. If disrupted, however, they can be replaced by the spreading of healthy cells.

#### **Limbus:**

The limbus is a transition zone between the cornea and the sclera. It is approximately 1 mm wide and the cornea is dependent upon it for receiving part of its nutrients. The limbal region becomes significant when fitting contact lenses since it is so closely connected to the cornea and some contact lenses will bear directly on it.

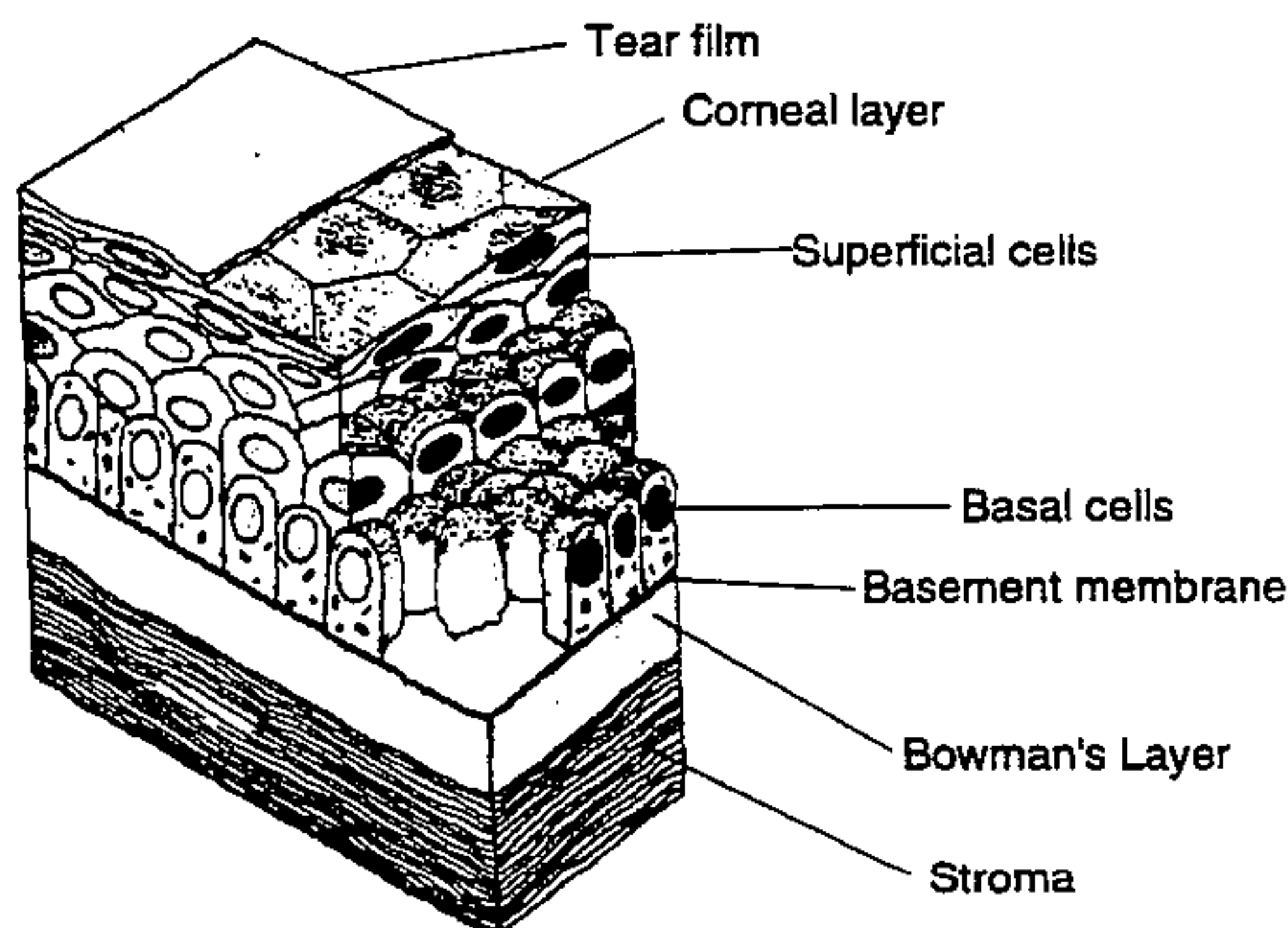
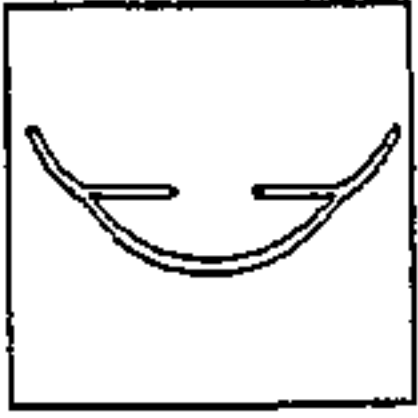


Diagram Of Corneal Epithelium



## Anatomy Review

A normal cornea is in a continual state of partial dehydration which also known as *deturgence*. If more water flows out than flows in, the cornea becomes *hypertonic* resulting in corneal thinning. Hypertonicity can be caused by a higher salt concentration placed on the cornea. Another aspect of the tear layer which you may need to know is its pH, which refers to its relative acidity or alkalinity. The pH of the human tear is approximately equal to 7.4. pH will be mentioned again in Part 6 when we cover contact lens solutions.

### Eyelids:

The eyelids function primarily to help keep the eye moist and to help keep out foreign bodies. It is the opposing action of the eyelids which causes tears to spread evenly over the cornea thus keeping it moist. The lids play an important role in the fitting and wear of contact lenses for the following reasons:

- They effect the wettability of the lens surface
- They effect the positioning of the lens
- They are sensitive and generally cause most of the discomfort when a lens is first placed on the eye

### Conjunctiva:

The conjunctiva is the loose tissue covering the sclera and inside the lids. The *bulbar conjunctiva* covers the sclera while the *palpebral conjunctiva* is that portion which lines the inner surface of the upper and lower eyelids.

### Cornea:

The cornea is the anterior refracting surface of the eye, it consists of transparent tissue and is devoid of blood vessels. The cornea is of utmost importance to the contact lens fitter since the lens sits directly on this tissue. The average corneal thickness is about 0.52 mm at its center and increases to about 0.65 mm at the limbal area and it is composed of five distinct layers.

**Epithelium:** That layer of the cornea which is exposed to the tears and comprises about 10 % of the total corneal thickness. The corneal epithelium is highly regenerative, demonstrating a remarkable ability to heal itself after being scratched. A corneal abrasion is often completely healed within 24 hours.

**Bowman's Membrane:** Is essentially a modification of the underlying stroma. Unlike the epithelium, if damaged by a scratch or cut, it can not regenerate itself so scarring will occur.