

Lacrimal apparatus – It consists of a number of structures which are concerned for secretion and passage of lacrimal fluid (tear).

The component parts are :

1. Lacrimal gland with ducts
2. Conjunctival sac
3. Puncta with Lacrimal canaliculi
4. Lacrimal sac
5. Naso-lacrimal duct.

Lacrimal gland – A serous gland situated in the lacrimal fossa which is the supero-lateral part of the roof of orbit and partly in upper eyelid (accessory lacrimal glands are found in conjunctival fornices).

Different parts – Two parts :

- (a) Orbital – upper larger part
- (b) Palpebral – lower smaller part

Both these parts are continuous with each other at the lateral border of Levator palpebrae superioris.

Orbital part – Features :

- (a) About the size and shape of almond
- (b) Situated on the medial aspect of frontal process of zygomatic bone
- (c) Relation –
 - Infront – orbital septum
 - Behind – connected to orbital pad of fat
 - Above – connected to orbital periosteum
 - Below – Levator palpebrae superioris.
 - Laterally – just above Lateral rectus muscle.

Palpebral part – Features :

- (a) Smaller – about one third of size of orbital part
- (b) Consists of 2 or 3 lobules
- (c) Situated below Levator palpebrae superioris and extends to the lateral part of upper eyelid and attached to superior fornix.
- (d) Is visible through conjunctiva after everting the upper eyelid.

Accessory Lacrimal gland – Small glands are found in or near the fornices and more in the upper eyelid than in lower lid. [So when Lacrimal gland is removed – the conjunctiva does not become dried due to presence of accessory glands].

Ducts of Lacrimal gland –

- (a) About 12 in number – 4 to 5 from orbital and 6 to 8 from palpebral part
- (b) Ducts of orbital part join into some of the ducts of palpebral part

- (c) End in superior fornix of conjunctival sac.

[Removal of palpebral part is functionally more or less equal to total removal of the gland because the ducts of orbital part open into ducts of palpebral part.]

Structure of the Lacrimal gland –

- (a) Compound tubulo-alveolar gland.
- (b) Alveoli are lined by simple columnar epithelium on basement membrane.
- (c) Myo-epithelial cells are present between epithelium and basement membrane.
- (d) Ultrastructurally 2 types of cells are found.
 - (i) 'K' Cells – secrete mucous and electrolucent granules.
 - (ii) 'G' Cells – secrete serous fluid electrodense.

Tears – Secretion of Lacrimal gland when overflowed forms tear.

Function –

- (a) Keeps the cornea moist and transparent.
- (b) Provides nutrition to cornea.
- (c) Kills bacteria.
- (d) Emotional expression is the shedding of tears.

Arterial supply of the gland – Lacrimal branch of ophthalmic artery.

Nerve supply –

1. **Lacrimal nerve** – Sensory to gland.
2. **Secreto motor fibres** – Preganglionic fibres from special Lacrimal nucleus

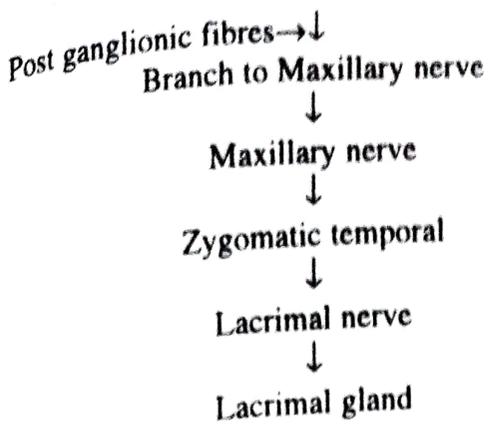
↓
Sensory root of Facial nerve

↓
Geniculate ganglion

↓
Greater petrosal nerve

↓
Nerve of Pterygoid canal

↓
Pterygo-palatine ganglion (Relayed here)



Lacrimal puncta and canaliculi

1. Canaliculi are two in number – one on each eye lid.
2. Each begins at the lacrimal punctum projecting inwards.
3. Length – 10 mm.
4. (a) Superior canaliculi directs at first upwards and forms a bend and passes downwards and medially into Lacrimal sac.
 (b) Inferior canaliculi at first is directed downwards and forms a bend and passes horizontally and ends in Lacrimal sac.
5. The bends of each canaliculi present dilata-tions and known as *ampulla*.
6. Structurally lined by *stratified squamous epithelium*.

Lacrimal sac – It is a membranous sac at the upper end of Naso-lacrimal duct.

Situation – In the lacrimal fossa formed by lacrimal bone and frontal process of maxilla.

Measurement –

Length – about 12 mm.

Wide – 5 mm.

Covering – Covered by Lacrimal fascia.

Relations –

Infront – Medial palpebral ligament and Orbicularis oculi

Behind – Lacrimal part of Orbicularis oculi

Medially –

(a) Groove separating from nasal cavity.

(b) Bony fossa separated by plexus of arteries by terminal part of facial artery.

Laterally – Lacrimal fascia and plexus of veins

Structure – lined by two layers of epithelium columnar and flattened.

Applied – *Dacryocystitis* is an inflammatory condition of the sac causing overflowing of the fluid (Epiphora).

Naso-lacrimal duct – It is a membranous passage extending from lower end of lacrimal sac to inferior meatus of the nose.

Length – 18 mm.

Direction – Downwards, backwards and late-rally.

Valve of Hasner – It is also known as lacrimal fold. It is a fold of mucous membrane at the lower end of Naso-lacrimal duct. It prevents entry of air into duct and then to the eye.

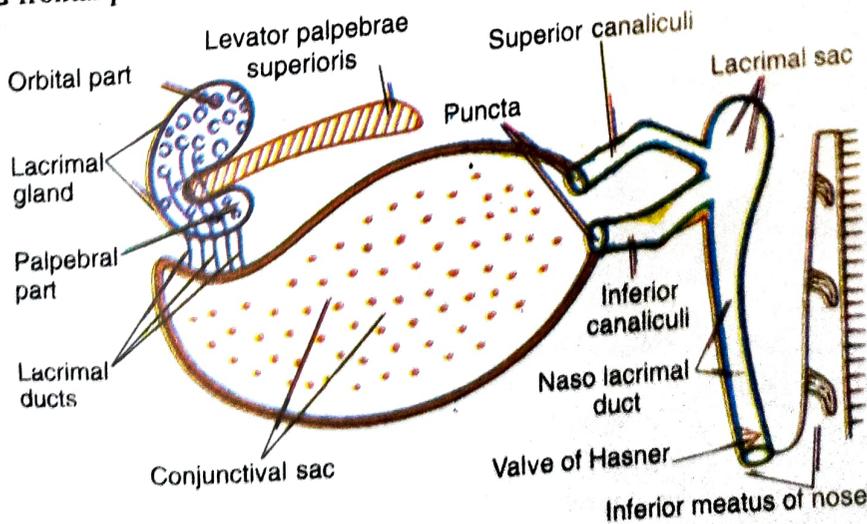


Fig 18.24 Lacrimal apparatus.

Structure – Lined by two layers of epithelium like lacrimal sac.

Development of Lacrimal apparatus – All the components are ectodermal in development.

1. Lacrimal gland and ducts – Epithelium of alveoli and ducts are ectodermal in development and from ectoderm of superior conjunctival fornix.
2. Lacrimal sac, canaliculi and nasolacrimal duct are developed from ectoderm of nasomaxillary groove.

Eyelids – These are two movable curtains