

EXPLORE THE ASHRUMARGA: A DISSECTIONAL APPROACH TO THE LACRIMAL SYSTEM'S ANATOMY**¹Dr. Archana A. Patel and ^{2*}Dr. Jui N. Shahane**¹Assistant Professor, Department of Rachana Sharir, S.S. Agrawal Institute of Ayurveda, Navsari, Gujarat.²Professor, Department of Rachana Sharir, J.S Ayurved Mahavidyalaya, Nadiad, Gujarat.***Corresponding Author: Dr. Jui N. Shahane**

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ABSTRACT

Our eyes are not only articulating organs of sight; they are also emotionally expressive organ of crying. The *Ashru* or the tears are part of a separate system called the lacrimal apparatus and this apparatus is situated close to the eyeball. Lacrimation is a protective mechanism, as the tears dilute and wash away irritating substance. *Ashru marga*, or the lacrimal apparatus lie in close relation to the *Netra*. This study will help to establish the relation between *Ashru marga* and lacrimal apparatus. This study has been done to study the *Ashru marga* and lacrimal apparatus with the help of cadaveric dissection. Dissection was carried out on minimum 5 cadavers (10 eyes) by using essential instruments. In dissection procedure structures of lacrimal apparatus were observed. Photographs were taken.

KEYWORD: *Ashru marga*, lacrimal apparatus, *Netra*.**INTRODUCTION**

Panch Inanendriyas are included in 16 *vikara* which are crucial and perform the function of imparting sense of hearing, touch, vision, taste and olfaction. All these special senses are a boon to mankind. The sense organs not only receive these but also help in improving the intellect of the individual. So, the human species is considered much more advanced. "*shirasi Indriyani Indriyapranvahani ch*" in this verse Acharya has explained the importance of *shiras*, as all the *Indriyas* and *Indriya pranvaha srotas* are present in *shiras* it should be given utmost importance.

Our eyes are not only articulating organs of sight; they are also emotionally expressive organ of crying. *Ashru marga* or the lacrimal apparatus lie in close relation to the *netra*. A thorough compilation of *Ashru marga* is not available in such. The present study is being taken up with an idea of updating concept of *Netra* and *Ashru marga* in parlance with advance anatomical description.

AIM AND OBJECTIVES

AIM: The study aims to compile all the literature available related to *Netra Sharira w.s.r.* to *Ashru marga* (lacrimal apparatus).

OBJECTIVES

1) To collect information available regarding *Netra Sharira*.

- 2) To compile data regarding *Ashru Marga*.
- 3) To study the *Ashru Marga* in relation to lacrimal apparatus by means of cadaver dissection.

MATERIAL AND METHODS

Sources used were classical literature of *Ayurveda* and contemporary sciences. The data obtained was critically reviewed and analysed to establish the relation between *Ashru marga* and lacrimal apparatus.

Dissection was carried on minimum 5 cadavers (10 eyes) by using essential instruments during my Post graduation on 2019. The cadavers were provided from PG Dept. of Rachana Sharir, J.S Ayurved Mahavidyalaya, Nadiad, Gujarat.

OBSERVATION AND RESULT

The dissection was performed bilaterally around the orbital cavity. Dissection procedure was carried out layer by layer, observed and studied following structure.^[2]

Skin: Skin of orbit is thin, non – hairy, and loose.

Superficial fascia: The superficial fascia is devoid of fat.

Palpebral fascia: Palpebral fascia was seen which formed palpebral ligament at the angles.

On Anterior aspect of the eye ball various structures were observed from superficial to deep. Orbicularis oculi muscle was observed.

Palpebral part of lacrimal gland: Superficial, small palpebral part of lacrimal gland situated within the eyelid. The gland is lobulated and glossy in texture. The aponeurosis of LPS is clearly seen to be separating palpebral and orbital part of the gland. The aponeurosis of LPS is seen flattened. Orbital part of the lacrimal gland: The orbital part of the gland is situated below the aponeurosis of LPS. The lacrimal gland is a lobulated structure, look like almond and situated in the medial side of the zygomatic process of the frontal bone at the superolateral angle of orbit.

Lacrimal duct: The duct of lacrimal gland, (6 to 10) ducts are observed, the ducts are shorter and slender. Conjunctiva lining the deep surface of the eyelid (palpebral conjunctiva and bulbar conjunctiva) was observed.

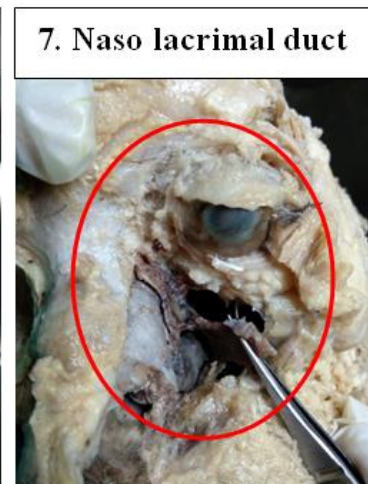
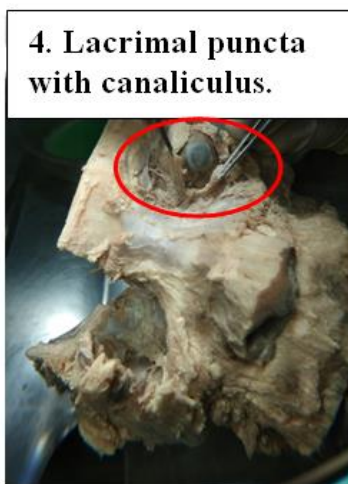
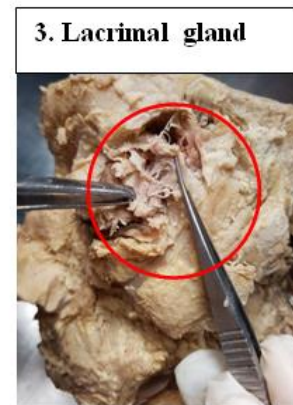
Lacrimal puncta and lacrimal canaliculi: Conjunctival sac was exposed. Two lacrimal puncta were observed,

they looked like tiny hole. Two tubular structures were observed, named as lacrimal canaliculi. Each begins at tiny hole (lacrimal puncta) which is situated in the anterior wall of the closed conjunctival sac on the summit of a lacrimal papilla. The lacrimal canaliculi run medially in the margin of the eyelid and opens into the lacrimal sac.

Lacrimal sac: Thick medial palpebral ligament was observed. Lacrimal sac lies posterior to the medial palpebral ligament. The sac is approximately 1 cm long. The lacrimal sac wall was thin.

Nasolacrimal duct: Nasolacrimal duct was found as a tubular structure. Lower end of lacrimal sac is continuous with the nasolacrimal duct. It runs downward, backward, laterally. This tube is about 1.5cm long and dark brown in colour. The duct was open in inferior meatus of nasal cavity below inferior nasal concha.

Dissection photos of Lacrimal Apparatus:



DISCUSSION

The physician who has knowledge of *shareera* and *veda* in its entire aspect promotes happiness to the world. To gain intact knowledge of *shareera* dissection of cadaver (*Mrutshareera shodhan*) is very essential.^[3] Detail knowledge of the human body is necessary for the wellbeing of the body. Eyeball still remains an

interesting aspect for researchers and is a subject of lot of concern to the common people. Lots of medicines, treatments procedures, and surgical procedures are available in almost all sciences because eyeball is crucial structure and its impairment disrupts most the life of individual.

Various mantras related to *Netra* and *Ashru* are available in *Rigveda* and *Bhagvatgeeta*. *Brihad Aryanka Upnishada* explained the formation of different structures of eyeball to different *dieties* for e.g. *Lord Aditya* is responsible for formation of *Ashrumarga* & *Kaneenika*.

Various *Acharya* has used different terminology for lacrimal apparatus. *Acharya Sushruta* and *Acharya Madhava* described lacrimal apparatus as *Ashru Marga*. Due to *Mithya ahar – vihar* vitiated *Doshas* reaches the junction through lacrimal duct produce painless discharges from the *kaneenika sandhi*, this is also known as *Netranadi*.^[4] *Ashtanga Hridaya* and *Ashtang Sangraha* quote lacrimal apparatus as *Jalavahini*.^[5] The process of formation and flow of tears is described as *Netrastrav Samprapti* by *Acharya Videha*.^[6] He described that the tears are carried by *sira* to various *netra sandhi*. These tears are expressed mainly at *Kaneenika sandhi*. Thus, it can be said that *Ashru* is direct contact with *Pakshma – Vartmagata Sandhi*, *Vartma – Shuklagata sandhi*, *Kaneenika* and *Apanga Sandhi*.

Netra vartma sira can be correlated to lacrimal duct and puncta which are present within *vartma* or inner surface of eyelid. *Netra kosh* can be co-related to lacrimal sac or lacrimal gland and *Netra kosha srotas* can be compared to canaliculi and nasolacrimal duct. After *Lekhana Anjana* *Dosha* are expelled through *Akshi* and *Nasa*, in *Akshi* through puncta and *Nasa* through nasolacrimal duct (which opens in *Nasa*).^[7]

On Anterior aspect of the eyeball various structures were observed from superficial to deep. *Orbicularis oculi* muscle was observed. Superficial, small palpebral part of lacrimal gland situated within the eyelid. The orbital part of the gland is situated below the aponeurosis of *LPS*. The lacrimal gland is a lobulated structure, look like almond and situated in the medial side of the zygomatic process of the frontal bone at the superolateral angle of orbit.

Glands of *Krause* are microscopic glands lying beneath the palpebral conjunctiva between fornix and the edge of tarsus. These are about 42 in the upper fornix and 6-8 in the lower fornix. Glands of *Wolfring* are present near the upper border, of the superior tarsal plate and along the lower border of inferior tarsus. Both glands are microscopic structure which is not during dissection.

The ducts of lacrimal gland (6 to 10 ducts) are observed, the ducts are shorter and slender. Conjunctiva lining the deep surface of the eyelid (Palpebral conjunctiva and bulbar conjunctiva) was observed. Conjunctival sac was exposed. Two Lacrimal puncta were observed, they looked like tiny hole.

Two tubular structures were observed, named as lacrimal canaliculi. Each begins at tiny orifice (lacrimal puncta)

which is situated in the anterior wall of the closed conjunctival sac on the summit of lacrimal papilla. The lacrimal canaliculi run medially in the margin of the eyelid and opens into the lacrimal sac. Medial palpebral ligament was observed. Lacrimal sac lies posterior to the medial palpebral ligament.

Nasolacrimal duct was found as a tubular structure. Lower end of lacrimal sac is continuous with the nasolacrimal duct. It runs downward, backward, laterally. The nasolacrimal duct mostly continues for around 1.5cm beneath the nasal mucosa after leaving its osseous channel. This part has a valve called the valve of *Hasner* which is present at the lower end of the duct and prevents reflux from the nose. But it was not visible during dissection. The duct was open in inferior meatus of nasal cavity below inferior nasal concha.

To improve our knowledge in medical science, the dissection of lacrimal apparatus has been done on cadaver. To learn particular anatomical entities properly, dissection and observation of cadaver is very much essential.

Ashru Marga is lacrimal apparatus which is described in contemporary science. The through literary review of *Ayurvedic* literature revealed that components of the *Ashru marga* have been described in dispersed manner in many areas while explaining different disease which may develop in lacrimal apparatus or which may involve lacrimal apparatus.

With the help of dissection individual structures of lacrimal apparatus were observed. The anatomical structures observed during dissection have impact on the management of the various eye disease and hence simplifies the treatment plans.

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