DISEASES OF THE LACRIMAL APPARATUS

University of Debrecen Medical and Health Science Centre,
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HUMAN TEARS

- Produced by the lacrimal glands.
- Distributed by the eyelids on the surface of the cornea.
- Creates a smooth corneal surface.
- Heads for the paranasal sinuses through the tearducts.

PROTECTING THE SURFACE OF THE EYEBALLS

- Against mechanical impacts (removing debris, friction)
- Against acute illnesses (antibacterial enzymes)

KEEPING THE SURFACE OF THE EYEBALLS WET

- Covering the irregularities of the corneal epithelium → Refraction

METABOLISM AND NUTRITION OF THE CORNEA & CONJUNCTIVA
THE TEARS

LIPID LAYER

- Forms a barrier layer.
- Stabilizes the tear film and prevents rapid evaporation.
- Creates a smooth refractive surface and maintains a consistent quality of vision.
- Protects the eyelids from maceration and creates a seal when the eyes are closed, reduces surface tension and enhances the tears by spreading.

AQUEOUS LAYER

- Supplies the corneal epithelium with atmospheric oxygen.
- Washes away remaining dead cells & bacteria from the conjunctival sac.
- Has antibacterial effects.
- Makes the cornea surface optically smooth → production of sharp image.

MUCOUS LAYER

- Decreases the surface tension, thereby it permits the easy spread of an aqueous layer on the cornea surface and facilitates corneal moistening.
- Prevents the watery layer from forming beads on the cornea and ensures that the watery layer moistens the entire surface of the cornea and conjunctiva.
- Washes away pollen, mote, etc.

THE IMBALANCE IN QUALITY AND QUANTITY OF THE COMPONENTS OF THE TEAR FILM AND BLINKING DISORDERS BOTH WORSEN THE DISTRIBUTION OF TEARS AND CAN PRESENT A SUBSTANTIAL PROBLEM.
I. STRUCTURES THAT SECRETE TEAR FLUID

- Meibomian glands
- Zeis & Moll glands
- Main & accessory lacrimal glands
- Goblet cells

II. STRUCTURES THAT DISTRIBUTE TEAR FILM

- Lids

III. STRUCTURES THAT FACILITATE TEAR DRAINAGE

- Lacrimal passages
I. SECRETORY SYSTEM
LIPIDS SUPPLY

MEIBOMIAN GLAND
Modified sebaceous glands that are arranged vertically within the tarsal plate.
The interactive force of an eyelid blink causes meibum to be excreted onto the posterior lid margin.

ZEISS & MOLL GLANDS
The pilosebaceous glands of Zeis and the apocrine glands of Moll are located anterior to the meibomian glands within the distal eyelid margin.
AQUEOUS SUPPLY

THE LACRIMAL GLAND  **ORBITAL & PALPEBRAL LOBE**

- Situated in a fossa in the outer part of the orbital roof.
- Situated in the outer part above the superior fornix.

RESPONSIBLE FOR REFLEX TEARING.

**THE LACRIMAL GLAND RECEIVES ITS SENSORY SUPPLY FROM THE LACRIMAL NERVE.**

Its parasympathetic secretomotor nerve supply comes from the n. intermedius.

The sympathetic fibres arise from the superior cervical sympathetic ganglion.

From D. Zoukhri
AQUEOUS SUPPLY

ACCESSORY LACRIMAL GLANDS
EXOCRINE AND AQUEOUS SECRETING ACCESSORY GLANDS

GLANDS OF KRAUSE
Located in the lamina propria of the conjunctival fornices.
Responsible for 2/3 of the basic tear secretion.

GLANDS OF WOLFRING
Located above the superior border of the upper lid tarsus.
Responsible for 1/3 of the basic tear secretion.

AQUEOUS SUPPLY

THE AQUEOUS SUPPLY CONTAINS ELECTROLITS, PROTEINS, ENZYMES AND METABOLITS.

The amount of the aqueous solvent hydrogen ions determines the PH value of tears (pH: 7,5 ). The proteins’ task is, among others, the control of osmolarity as well as the reduction of surface tension. The immunoglobulins, enzymes, present in the aqueous phase as well as the lysozyme and lactoferrin all contribute to the antibacteriual protection.

From A. Berta
GLYCOPROTEINS

SUPPLY THE OCULAR SUPERFACTANT

PRODUCED BY:

- Conjunctival Goblet cells
  Secrete mucous in the tarsal and limbal regions called the crypts of Henle and the glands of Manz.
- The main and accessory lacrimal glands.
- The epithel cells of the cornea & conjunctiva.

WE CAN MAKE A DISTINCTION BETWEEN THE GEL PRODUCING ENDOTHELIAL GLYCOCALYX LAYER AND THE SOLVENT MUCIN MOLECULES.

THE TEAR FILM IS CONSIDERED TO BE THREE-PHASED BUT TWO-LAYERED DUE TO THE REACTION OF THE AQUAEOUS AND MUCIN PHASES.
II. DISTRIBUTIONAL SYSTEM

EYELIDS

- Protect the anterior surface of the globe from local injury.
- Regulate - the light reaching the eye
  - the temperature of the tear film.
- Distribute the protective and optically important tear film over the cornea during blinking; and in tear flow, by their pumping action on the conjunctival and lacrimal sac.

EYELIDS ANATOMY

- skin and subcutaneous tissue
- the orbicularis oculi muscle
- the submuscular areolar tissue
- the fibrous layer, consisting of the tarsi and the orbital septum
- the lidretractors of the upper and lower eyelids
- the retroseptal fat pads
- the conjunctiva
THE SHINGLE-LIKE ARRANGEMENT OF THE FIBERS OF THE ORBICULARIS OCULI MUSCLE CAUSES THE EYE TO CLOSE. THIS WINDSHIELD WIPER MOTION MOVES THE TEAR FLUID MEDially ACROSS THE EYE TOWARD THE MEDIAL CANTHUS.
III. EXCRETORY SYSTEM

The tear film travels from the puncta into the upper and lower canaliculus, which empty into the lacrimal sac. The lacrimal sac drains into the nasolacrimal duct which connects to the nasal passage. This connection between the tear production system and the nose is the reason your nose runs when you cry.
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DISEASES OF THE LACRIMAL SYSTEM

From Jarvis, 1996.
I. DISEASES OF THE SECRETORY SYSTEM

MEIBOMIAN GLAND DYSFUNCTION (MGD)

MEIBOMIAN GLAND DYSFUNCTION CAN EXIST ALONE, OR IT CAN BE ASSOCIATED WITH ANTERIOR BLEPHARITIS OR SEBORRHEIC DERMATITIS.

Most common form of lid margin disease; nearly 40% of routine eye care patients and 50% of contact lens wearers are affected.

❖ **EARLY STAGES:** patients are often asymptomatic.

❖ **LATE STAGES:** either cause or exacerbate dry eye-like symptoms: dryness, burning, itching, stickiness, foreign body sensation, watering, photophobia and intermittent blurred vision.

http://www.revoptom.com/content/c/15811/
KERATOCONJUNCTIVITIS SICCA (KCS)

Noninfectious keratopathy characterized by reduced moistening of the conjunctiva and cornea

**Epidemiology**
- KCS as a result of dry eye is one of the most common eye problems in middle ages.
- Women are more frequently affected (86%) due to hormonal changes.
- More prevalent in regions with higher levels of environmental pollution.

**Etiology**

**Reduced tear production**
- Associated with systemic disorders (Sjögren’s syndrome, RA)
- Result of lacrimal gland atrophy or destruction

**Altered composition of the tear film**
- Vitamin A deficiency
- Medications (oral contraceptives and retinoids)
- Certain environmental influences (nicotine, smog, air conditioning)
KERATOCONJUNCTIVITIS SICCA

Symptoms
- Burning
- Reddened eyes
- Excessive lacrimation (reflex lacrimation) from slight environmental causes (wind, cold, low humidity, reading)
- Foreign body sensation
- May be accompanied by pain

Therapy
**Depending on the severity of findings**
- Artificial tear solution in varying viscosities
- The puncta can be temporarily closed (silicon punctal plugs)
- Surgical obliteration of the puncta
- Installing air humidifier
- Gynecologist should be consulted regarding the hormonal status!
International Classification of Dry Eye WorkShop-2007

Dry Eye

Aqueous-deficient

Sjögren Syndrome Dry Eye
- Primary
- Secondary

Non-Sjögren Dry eye
- Lacrimal Deficiency
- Lacrimal Gland Duct Obstruction
  - Reflex block
  - Systemic Drugs

Evaporative

Intrinsic
- Meibomian Oil Deficiency
- Disorders of Lid Aperture
  - Low Blinking Rate
- Drug Action Accutane

Extrinsic
- Vitamin A Deficiency
- Topical Drugs Preservatives
- Contact Lens Wears
- Ocular Surface Disease Eg. Allergy
EVALUATION OF THE TEAR FILM

SCHIRMER TEST: 10-30 MM/ 5 MIN
Provides information on the quantity of watery component in tear secretion.

SCHIRMER I /II
Measure the basic and reflex secretion

TEAR BREAK-UP TIME (TBUT)
Evaluate the stability of the tear film.
Normal TBUT of at least 10 seconds is normal.

ROSE BENGAL TEST
Dyes dead epithelial cells and mucin.

IMPRESSION CYTOLOGY
Density of goblet cells is estimated under a microscope (normal: 20-45 goblet cells/mm²).

Evaluation of the tear meniscus height with the OCULUS Keratograph.


INFLAMMATIONS OF THE LACRIMAL GLAND

ACUTE DACRYOADENITIS

Etiology

Often attributable to
- Pneumococci
- Staphylococci

Less frequently to
- Streptococci

May be a relationship between the disorder and the infectious diseases
- Mumps
- Measles
- Scarlet fever
- Diphtheria
- Influenza
- Epstein-Barr Virus

http://dro.hs.columbia.edu/dacryoadenitis.htm
ACUTE DACRYOADENITIS

- Uncommon, usually unilateral condition
- Present with temporal upper eyelid
- The eyelid skin is red and swollen
- The bulbar conjunctiva is chemotic and erythematous
- Pain and discharge
- Patients generally feel unwell (febrile)
- The globe may be shifted inferiorly and medially
- The preauricular lymph node may be enlarged

**TREAT THE UNDERLYING DISEASE!**

**THE UPPER LID TYPICALLY IS PTOTIC AND HAS A §-SHAPED CURVE**

The inflamed swollen gland is especially sensitive to palpation.

WARM COMPRESS, AB EYEDROPS & OINTMENT
IF IT REMAINS UNTREATED MAJOR COMPLICATIONS ARE: ABSCESS FORMATION & SCARRING.
CHRONIC DACRYOadenitis

Chronic dacryoadenitis is really rare.

Etiology

- Immunological diseases
- Reumatological diseases
- Tuberculosis
- Hematologic diseases

THE SYMPTOMS ARE NOT AS INTENSE AND SERIOUS AS IN AN ACUTE FORM.

- Painless – usually bilateral – symptoms are swelling respective to the lacrimal glands, ptosis, narrowing of the palpebral fissure. **NO HYPEREMIA!**
- The globe may be shifted inferiorly and results diplopia.

TREAT THE UNDERLYING DISEASE!

STEROID THERAPY TO PREVENT SCARRING OF THE LACRIMAL GLAND.
IF IT LAST LONG, OR DISCHARGE IS PRESENT THE LACRIMAL GLAND BIOPSY IS RECOMMENDED!
TUMORS OF LACRIMAL GLAND

ADENOID CYSTIC CARCINOMA (ACC)

Lacrimal gland tumors comprise about 10% of orbital tumors. About 20% of solid lacrimal gland tumors are of epithelial origin, with about 45% being malignant. Of the malignant epithelial lacrimal gland tumors, about 60% are ACCs, and these most often involve the orbital lobe of the lacrimal gland.

DIFFERENTIAL DIAGNOSIS
- Dacryoadenitis chronica! (ACC is unilateral!)
- Lymphoma and other inflammatory conditions
- Pleomorphic adenoma
- Other malignant epithelial tumors of the lacrimal gland: 20% are pleomorphic adenocarcinoma, 10% are primary adenocarcinoma, and 5% are mucoepidermoid carcinoma.

TREATMENT
- Surgery with or without bone removal and adjuvant radiotherapy.
- Radiotherapy is often initiated in cases of perineural invasion.

GENERALLY PRESENTS IN YOUNG OR MIDDLE-AGED ADULTS.
II. DISEASES OF THE STRUCTURES THAT DISTRIBUTE TEAR FILM

EYELID PROBLEMS RANGE FROM BENIGN, SELF-RESOLVING PROCESSES TO MALIGNANT, POSSIBLY METASTATIC TUMORS.

1. INFLAMMATION, INFECTION
2. BENIGN AND MALIGNANT TUMORS
3. STRUCTURAL PROBLEMS

MOST EYELID DISORDERS ARE NOT VISION- OR LIFE-THREATENING. HOWEVER, MANY CAUSE IRRITATIVE SYMPTOMS SUCH AS BURNING, FOREIGN-BODY SENSATION OR PAIN.
BLEPHARITIS

- One of the most common eyelid problems.
- Etiology: allergy, medications, irritation etc.
- Patients typically experience itching, burning, mild foreign-body sensation, tearing and crusting around the eyes on awakening.
- On examination, the eyelid margins are erythematous and thickened with crusts and debris within the lashes.
- Conjunctival injection or a mild mucus discharge may be present.
- If severe, blepharitis may result in corneal infiltrates or ulcers.
- Ocular rosacea: occurs with chronic bacterial lid infection, meibomian gland dysfunction, seborrhea and acne rosacea.
TREATMENT OF BLEPHARITIS

- Warm compresses (15 minutes 2x a day)
  Loosens irritating crusts in the eyelashes
  and melts the oil produced by the meibomian glands, which can occlude the gland orifices.

- Eyelid scrubs.

- If obvious infection is present, AB eyedrops & ointment could be used.

- If the condition is unresponsive to treatment, eyelid cultures should be obtained to rule out the possibility of resistant organisms.

- Oral AB may be used in patients with the diagnosis of ocular rosacea.

RARELY, SEBACEOUS CELL CARCINOMA MAY MASQUERADE AS UNILATERAL OR BILATERAL UNTREATABLE BLEPHARITIS.
HORDEOLUM

- **Internal hordeolum**: involves infection of the meibomian gland ➔ chalazion.
- **External hordeolum**: occurs with infection of the more anteriorly located glands of Zeis or Moll.
- Acutely presenting, erythematous tender lump within the eyelid.

**TREATMENT**

- Usually drain spontaneously after 1 week of treatment with warm compresses 4x a day & topical AB ointment 2x daily.
- Incision and drainage are required for non-resolving lesions.

**SUSCEPTIBILITY FACTORS**: WEAKENED IMMUNE SYSTEM, LOW HYGIENIC CONDITIONS, CONTAGIOUS ILLNESSES (STAPHYLOCOCCUS), EXCESSIVE MAKE-UP APPLICATION.
CHALAZION

- Obstruction of the meibomian gland → chalazion.

  The blockage of the gland's duct at the eyelid margin results in release of the contents of the gland into the surrounding eyelid soft tissue. A lipogranulomatous reaction ensues.

- May be tender & erythematous before evolving into a nontender lump and appear as chronic subcutaneous nodules.

- Frequently become secondarily infected, associated with blepharitis.

TREATMENT

- Warm compresses applied for 15 minutes 4x a day.

- Blepharitis, if present, should be treated with AB.

- If the lesion persists after 4 weeks of therapy, it may be incised and drained.

THE RECURRENCE OF THE PREVIOUSLY ADEQUATLY OPERATED CHALAZION CAN REFER TO ADENOCARCINOMA!
2. TUMORS OF THE EYELID

BENIGN LESIONS OF THE EYELID

MANY NON-INFLAMMATORY BENIGN LUMPS AND CYSTS MAY OCCUR AROUND THE EYELIDS:

• Skin (papilloma, seborrheic keratosis)
• Glands: sweat glands (cyst of Moll, benign tumor), sebaceous glands (cyst of Zeis, sebaceous cyst etc.)
• Pigment cells (melanocytic nevus)
• Hair follicles (benign tumour)
• Blood vessels (vascular nevus).

MALIGNANT LESIONS OF THE EYELID

BASAL CELL CARCINOMA (BCC)

❖ The most common eyelid malignancy.

DOES NOT TEND TO METASTASIZE, IT MAY BE LOCALLY INVASIVE!

SQUAMOCELLULARIS CARCINOMA (SCC)

❖ Much less common than basal cell carcinoma.

BEHAVES AGGRESSIVELY AND FAST GROWING, METASTASIZE!

❖ They may arise de novo or from areas of actinic keratosis → carcinoma.

TREATMENT

COMPLETE SURGICAL RESECTION WITH HISTOLOGIC CONTROL OF MARGINS.

Radiation and cryotherapy, which have higher recurrence rates than surgical resection, are used when surgery is not appropriate or possible.
MALIGNANT LESIONS OF THE EYELID

SEBACEOUS CARCINOMA
- Occurs in middle-aged to elderly patients and may mimic a chalazion or chronic blepharitis.
- It invades locally and spreads to regional preauricular or submandibular lymph nodes (lungs, liver and bone).

MELANOMA MALIGNUM
- Rare pigmented eyelid tumor (1%).
- Must be differentiated from nevi and basal cell carcinoma

TREATMENT

COMPLETE SURGICAL RESECTION WITH HISTOLOGIC CONTROL OF MARGINS.
Radiation and cryotherapy, which have higher recurrence rates than surgical resection, are used when surgery is not appropriate or possible.
3. STRUCTURAL PROBLEMS OF THE EYELID

ENTROPION

❖ Most commonly: occurs in elderly as a result of age-related changes. Other cases: are caused by scarring - either from trauma, infection, or an inflammatory condition.

❖ In-turning, of the eyelid can involve the upper or lower eyelid.

❖ Symptoms occur due to the scratching of the eye by numerous inwardly pointing eyelashes (trichiasis). It is impractical to pull all of them.

❖ Irritation, redness and stringy white mucoid discharge can be observed.

TREATMENT IS ARTIFICIAL TEAR DROPS AND LUBRICATING EYE OINTMENT UNTIL SURGICAL REPAIR CAN BE PERFORMED.
ECTROPION

- Out-turning of the eyelid (the lower lid) & visibly appears to sag down.
- Most of the time, ectropion occurs along with general aging changes in the skin. The lower eyelid can become looser, and eventually pull away from the eye by gravity.
- The normal eyelids press flush against the eye and keep the eye bathed in lubricating tears. If the eyelid sags away the eye become severely dry. The tears have no way to drain away except onto the face.
- Dryness of the cornea leads to a scratchy sensation, redness of the eye, pain, and blurred vision.
- Sometimes the cornea can become infected.
- Bell's Palsy, or a temporary paralysis of the side of the face, can suddenly make normal aging changes much worse.

TREATMENT IS LUBRICATING TEAR DROPS AND OINTMENT BEFORE SURGERY.
TAKE HOME MESSAGE!

IN CASE OF THERAPY-RESISTENT EYE-LID INFLAMMATIONS
(BLEPHARITIS, CHALAZION) ALWAYS SUSPECT THE POSSIBILITY OF TUMOR!

- All pigmented eyelid tumors should be photographed for comparison with future examinations!
- Suspicious eyelid tumors should be evaluated by BIOPSY!

http://www.google.hu/search?tbm=isch&source=univ&sa=X&ei=3NTRUd3wG2P24QTTh51HgAw&ved=0CCsQsAQ&biw=1280&bih=972&q=FUNNY%20IMAGE%20WITH%20ANIMAL
III. CAUSES OF THE LACRIMAL DRAINAGE SYSTEM OBSTRUCTION

CONGENITAL
Absence or atresia of canaliculi &/or puncta.
Incomplete opening of the nasolacrimal duct (associated with craniofacial anomalies)

SENILE Puncta stenosis or associated with chronic infection

ECTROPION OR CONJUNCTIVAL CICATRISATION

TRAUMA Physical or radiation

INFLAMMATION Sarcoid, Wegener’s

DRUG INDUCED Pilocarpine, Adrenaline etc.

INFECTION
Acute or chronic dacryocystitis
Canaliculitis (HSV, VZV etc.)
Sinusitis

LACRIMAL SAC TUMORS (SCC, BCC etc.)

http://www.eyeplastics.com/100-Overview/
CONGENITAL NASOLACRIMAL DUCT OBSTRUCTION (NLDO)

NLDO is very common in infants. About 6% of children are born before their tear ducts open. Most of these children have no problems, the tear ducts open spontaneously.

If the ducts do not open quickly, the tear duct can become infected and cause pus to collect between the eyelids. AB and massage might help, but don’t cure the blockage. Approximately 95% of children with tear duct blockages show resolution before their first birthday.

If the blockage does not resolve naturally, surgery may be necessary. A probing procedure might be done if the duct remains blocked after the baby is six months to one year old.

SURGICAL PROBING SUCCESSFULLY OPENS THE BLOCKED DUCT FOR ABOUT 90 OUT OF 100 BABIES.
TESTS OF THE LACRIMAL DRAINAGE SYSTEM OBSTRUCTION

**DYE DISAPPEARANCE TEST (DDT)**

To assess the presence or absence of adequate lacrimal outflow, especially in unilateral cases, the examiner instills fluorescein drops into the conjunctival fornices of each eye. Then the tear film is observed with the cobalt blue filter of the slit lamp. Persistence of significant dye and particularly asymmetric clearance of the dye from the tear meniscus over 5 minutes indicate an obstruction.

If the DDT result is normal, severe lacrimal drainage dysfunction is highly unlikely.

**IRRIGATION TEST**

A lacrimal irrigation cannula is passed into the punctum and advanced through the canaliculus to the lacrimal fossa. Clear water or saline is then irrigated through the cannula. If fluid passes into the nose without reflux out of the opposite canaliculus, the system is patent. If no fluid passes but it all comes back through either punctum, nasolacrimal duct obstruction is present.
DACRYOCYSTOGRAPHY

http://mrdavidcheung.com/page46/page43/page20/
DACRYOCYSTO-RHINOSTOMIA (DCR)

Surgery is required when the nasolacrimal duct is blocked. A physician may attempt to widen the opening by flushing water through the duct when it is only partially blocked. These simple attempts to open the tear duct aren’t often successful and might need to be repeated periodically. Surgery could be necessary.

DCR creates an opening in the bone between the blocked tear sac and the nose. The lining of the tear sac is then attached to the lining of the nose to form a permanent drainage channel for tears. The surgeon places a clear plastic tube from the inside corner of the eye into the nose. The tube helps stent the tear drainage system and prevents scarring.
CANALICULITIS

- Genuine canaliculitis is rare.
- Usually the inflammation proceeds from the conjunctiva.
- Fungi, bacteria often cause persistent purulent granular concrements that are difficult to express.

SYMPTOMS
- The canaliculus region is swollen, reddened and often tender to palpation.
- Pus or granular concrements can be expressed.

TREATMENT
- AB eyedrops and ointments (according to the specific pathogens detected in cytologic smears)
- Successful treatment occasionally requires surgical incision of the canaliculus.
DACRYOCYSTITIS

- The cause is usually a stenosis within the lacrimal sac - a blockage of the nasolacrimal duct.
- The retention of the tear fluid leads to infection: Staphylococci, Pneumococci, etc.
- May occur suddenly (acute) or be longstanding (chronic).
- Mostly affects adults.

SYMPTOMS OF ACUT DACRYOSYSTITIS

- The area around the tear sac is painful, red, and swollen. Slight pressure applied to the tear sac may push thick material through the punctum. Sometimes, the infection is severe and can cause fever. Pus (abscess) may form, which can rupture through the skin, creating a passage for drainage.

SURROUNDING TISSUE INVOLVEMENT IS A RISK OF SEPSIS AND CAVERNOUS SINUS THROMBOSIS, WHICH IS LIFE THREATENING!!!
ACUTE DACRYOCYSTITIS

DIFFERENTIAL DIAGNOSIS

- **Hordeolum** (small, circumscribed, nonmobile inflamed swelling).
- **Orbital cellulitis** (usually motility of the eyeball).

TREATMENT

- Applying warm compresses several times a day.
- Acute infection is usually treated with AB taken orally (according to the specific pathogens detected). If fever is present or the infection is severe, AB is given intravenously.
- Pus from a fluctuating abscess is best drained.
- After the acute infection resolves, surgery is recommended to bypass the blockage (DCR) so that infection does not recur.
CHRONIC DACRYOCYSTITIS

- Is usually caused by blockage of the nasolacrimal duct.
- Often secondary to chronic inflammation of the connective tissue or nasal mucosa.
- Dacryocystitis is frequently chronic with bulging of the skin over the tear sac. Initial characteristic is increased lacrimation. When pressure is applied, the bulge may not be painful, but a pus-like or cheese-like material often comes out of the punctum.

CAN LEAD TO A SERPIGINOUS CORNEAL ULCER!
DCR IS THE MAIN TREATMENT FOR CHRONIC DACRYOCYSTITIS!
TAKE HOME MESSAGE!

THE „PERFECT” TEAR

I. PRODUCTION OF TEARS

II. DISTRIBUTION OF THE TEAR FILM

III. TEAR DIVERSION

TO MAINTAIN A HEALTHY EYE SURFACE, AN ADEQUATE AMOUNT AND QUALITY OF TEARS IS INDISPENSABLE, WHICH NOURISHES, WATERS AND PROTECTS THE CORNEA AND CONJUNCTIVA SURFACE.

THE THIN TEAR FILM COVERING THE CORNEA CREATES AN EVEN AND SMOOTH OPTICAL BARRIER SURFACE THAT IS NECESSARY FOR A CLEAR VISION.

THANK YOU FOR YOUR ATTENTION!