



جامعة المستنقب  
AL MUSTAQBAL UNIVERSITY

*AL-MUSTAQBAL University*

*College of Health and Medical Technologies*

*Department of Optical Technologies*

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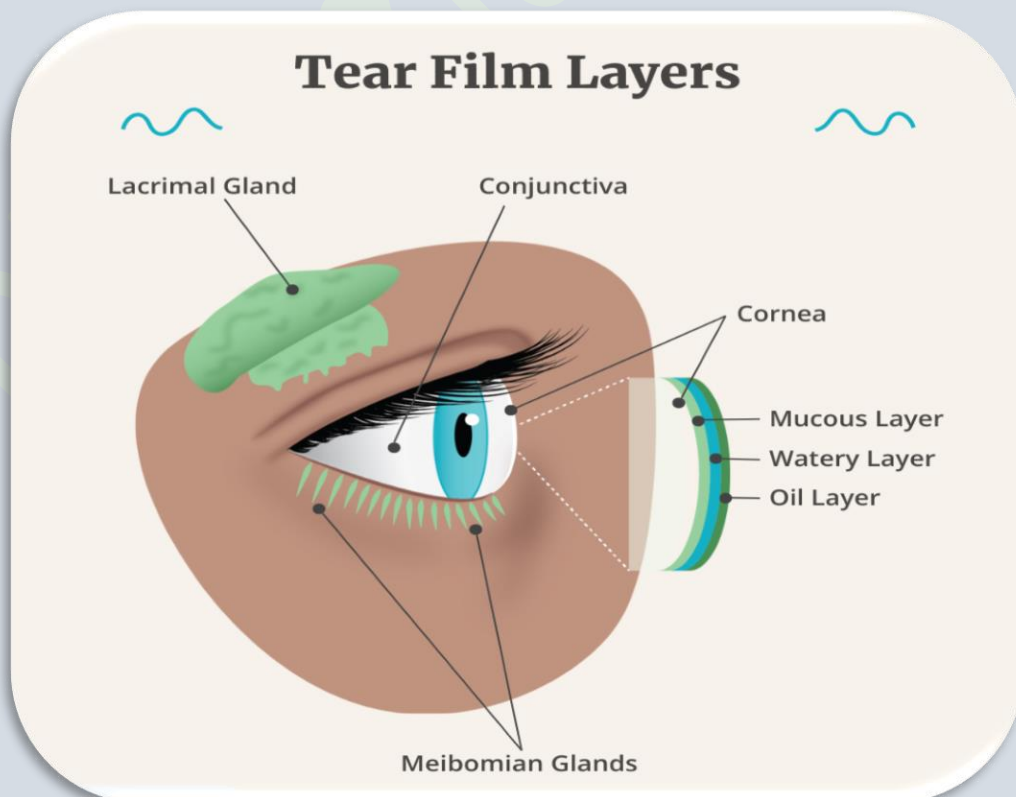
*MSc Optometry*

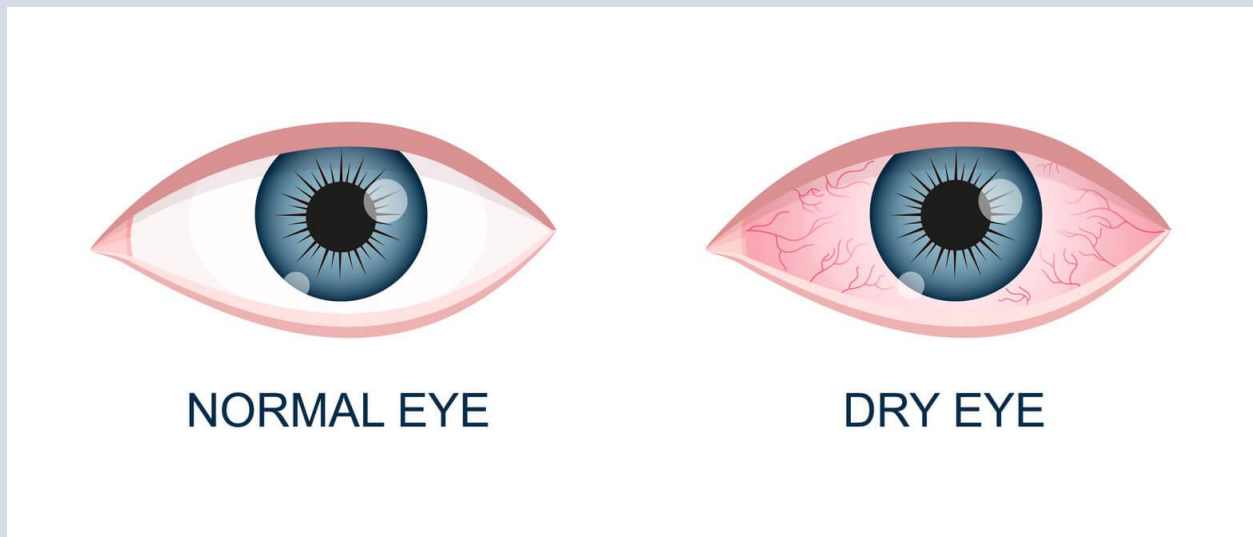
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*Subjective : Pharmacology*

*Title: Pharmacology for Dry Eye Disease (DED)*

- *Definition: A multifactorial disease affecting the tear film and ocular surface.*
- *Causes:*
  - *Meibomian gland dysfunction (MGD)*
  - *Decreased tear production (e.g., Sjögren's syndrome)*
  - *Environmental factors (e.g., screen time, contact lenses)*
- *Symptoms: Dryness, irritation, redness, blurred vision.*





## 1. Tear Substitutes (Artificial Tears)

- *Lubricate and hydrate the ocular surface*
- *Examples: Carboxymethylcellulose, hyaluronic acid, hydroxypropyl methylcellulose*
- *Preservative-free options preferred for frequent use.*



**Table 1. FDA-approved Demulcents for Artificial Tears by Group<sup>9</sup>**

Active Ingredient	Concentration	Function(s)
Cellulose Derivatives		
CMC	0.2% to 2.5% (up to 1% commercially)	Increases viscosity
Hydroxyethyl cellulose, HPMC, methylcellulose	0.2% to 2.5% (up to 0.8% commercially)	Crosslinks with ocular surface, increases viscosity
Dextran 70	0.1%	Increases mechanical strength of tear film
Liquid Polyols		
PEG 300	0.2% to 1%	Increases viscosity
PEG 400	0.2% to 1%	Increases viscosity
Glycerin	0.2% to 1%	Increases viscosity, is an osmoprotectant
Polysorbate 80	0.2% to 1%	Stabilizes emulsions
PVA	0.1% to 4% (up to 1.4% commercially)	Lowers viscosity
Povidone	0.1% to 2%	Increases viscosity

## 2. Anti-inflammatory Agents

- Cyclosporine A (Restasis, Cequa): Inhibits T-cell activation, increases tear production
- Lifitegrast (Xiidra): Blocks LFA-1/ICAM-1 interaction, reducing inflammation
- Corticosteroids (short-term use): Prednisolone, loteprednol for acute flares.





### *3. Secretagogues*

- *Pilocarpine, Cevimeline: Stimulate tear production (used in Sjögren's syndrome)*

### *4. Antibiotics for Meibomian Gland Dysfunction (MGD)*

- *Doxycycline, azithromycin: Reduce inflammation and improve oil gland function*

### *5. Autologous Serum Eye Drops*

- *Derived from patient's blood; contains growth factors for ocular healing*
- *Combination therapy is often needed for optimal management*
- *Novel therapies in development: gene therapy, biologics, regenerative medicine*
- *Importance of patient education and lifestyle modifications*