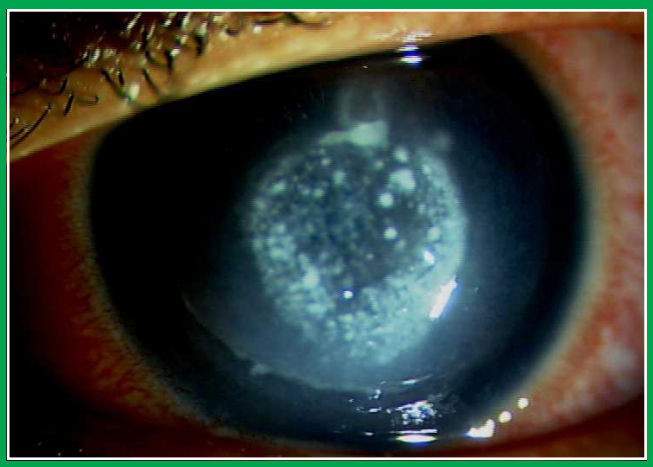
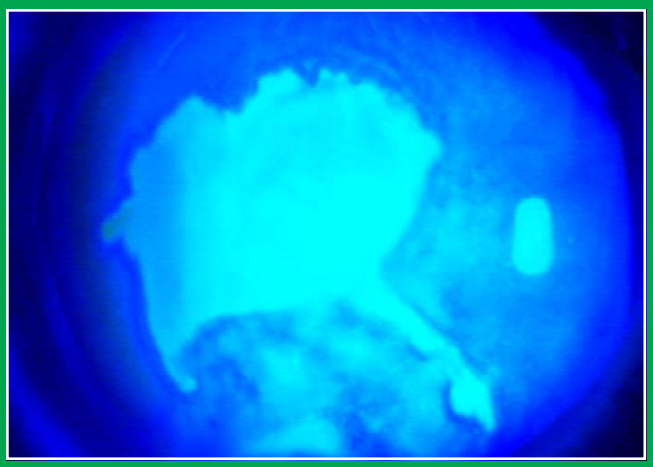
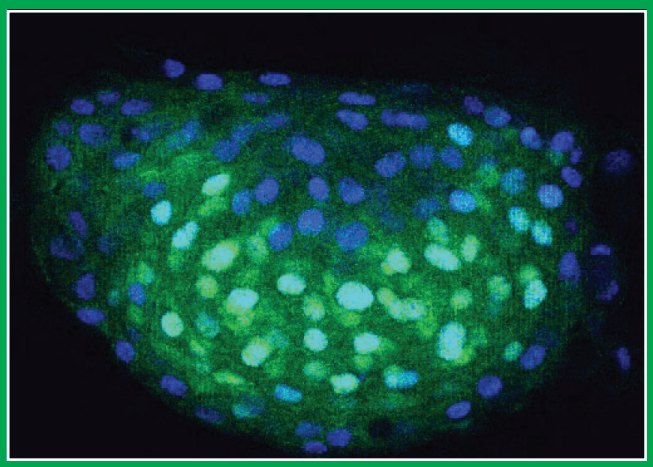




Cornea and External Diseases



Ethics and Professionalism in Ophthalmology

Some of the goals listed below are specific to the requirements of the United States or other nations. They are included here as a guideline only.

Basic Level Goals:

1. Provide the definition and basic concepts behind the following terms used in medical ethics:
   a. Morality versus ethics (intent-based standards versus conduct-based standards)
   b. Autonomy and surrogacy
   c. Beneficence
   d. Nonmaleficence
   e. Truth telling
   f. Distributive justice
   g. Fiduciary responsibility to patients
   h. Compassion
2. Describe the ethical principles listed in the following key medical documents:
   a. Hippocratic Oath[1]
   b. Declaration of Geneva[2]
   c. Ethical Code, International Council of Ophthalmology[3]
   d. Code of Ethics, American Academy of Ophthalmology[4]
3. Describe the basics of ophthalmic practice management:
   a. Partnership arrangements
   b. Income distribution methods
   c. Contractual negotiations
   d. Hiring and supervising of employees
   e. Basic accounting
      i. Profit/loss statements
      ii. Billing
      iii. Collections
      f. Financial management
4. Describe the basics of the health care system and reimbursement for services as appropriate to the local, regional, and national market of the trainee (eg, medical documentation, third party payers, managed care, Medicare [USA], Medicaid [USA], private insurance, nationalized health care systems [United Kingdom, Canada, and others]).

Standard Level Goals:

1. Describe basic medical ethics in the ophthalmic practice, including:

a. Confidentiality of health information
b. Professional competence and maintenance of competence
c. Informed consent
d. Responsibility to report the unethical conduct of others
e. Adequate patient assessment and avoidance of under/over treatment and under/over testing

2. Identify elements of effective physician-patient communication, including:

a. Relevant cultural and linguistic differences that potentially influence ethical delivery of services

3. Describe advanced aspects of practice management (eg, business models, documentation requirements and coding, privacy requirements, accommodating patients or employees with disabilities).
4. Describe advanced aspects of health care reimbursement (eg, physicians' role in managed care organizations, administrative role, third-party reimbursement, capitated programs).
5. Describe the framework of patient-care quality as it relates to patient safety, patient advocacy, effectiveness, efficiency, timeliness, and equity.
6. Describe how ophthalmologists are responsible for ensuring that all those in the service area of the practice have access to affordable eye care, and define how ophthalmologists are uniquely trained and certified to do so.
7. Identify the various missions of ophthalmology organizations with respect to service to members, patients, clinical education, quality of care. Define and mitigate the consequences of conflicting missions.
8. Identify how participation of ophthalmologists in ophthalmology organizations serves the profession and society.
9. Identify the responsibilities of ophthalmologists and ophthalmology societies to ensure that everyone has the right to sight.

Advanced Level Goals:

1. Recognize and use advanced medical ethics in the ophthalmic practice:

a. Applicable informed consent documents (eg, clinical research, off-label use disclosures)
b. Management (offering and rendering) of second opinions
c. Individual and institutional responsibilities regarding impaired physicians
d. Responsibility for postoperative care, including appropriate transfer of care to other physicians
e. Appropriate delegation to limited license auxiliaries
f. Fairness of fees
g. Management of conflicts of interest (clinical and nonclinical)

i. Disclosures
ii. Gifts to physicians
h. Appropriate advertising (and applicable laws)
i. Appropriate conduct as a medical-expert witness in litigation

2. Describe the ethical principles listed in the following key medical documents regarding research involving human subjects:
a. Nuremburg Code5
b. Declaration of Helsinki6
c. Belmont Report7

3. Identify applicable insurance coverage responsibilities in a practice situation.

4. Utilize more advanced aspects of health care reimbursement in a clinical practice (eg, denials of claims, hospital contracting, electronic billing).

5. Work within integrated eye care delivery systems (both within eye care specialties and within general medicine and surgery).

6. Participate in all of the foregoing aspects of practice management to the best ability within a medical education setting.

7. Utilize all of the foregoing ethical principles and knowledge in direct patient care.

8. Describe the responsibility of ophthalmologists to share their knowledge of clinical arts and sciences for the benefit of patients, the profession, and society.

Medical Ethics Documents

1. Hippocratic Oath
http://www.nlm.nih.gov/hmd/greek/greek_oath.html

2. Declaration of Geneva, World Medical Association
http://www.wma.net/en/30publications/10policies/g1/

3. Ethical Code, International Council of Ophthalmology
www.icoph.org/pdf/icoethicalcode.pdf

4. Code of Ethics, American Academy of Ophthalmology
http://www.aao.org/about/ethics/code_ethics.cfm

5. Nuremburg Code
http://ohsr.od.nih.gov/guidelines/nuremberg.html

6. Declaration of Helsinki, World Medical Association
http://www.wma.net/en/30publications/10policies/b3/

7. Belmont Report
http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html

Cornea and External Diseases

Basic Level Goals:

A. Cognitive Skills

1. Describe the basic anatomy, embryology, physiology, pathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa.**
2. Understand the fundamentals of corneal optics and refraction (eg, astigmatism, keratoconus).**
3. Describe congenital abnormalities of the cornea, sclera, and globe (eg, Peter anomaly, microphthalmos, birth trauma, buphthalmos).**
4. Describe characteristic corneal and conjunctival degenerations (eg, pterygium, pinguecula, Salzmann nodular degeneration, senile plaques of the sclera).**
5. Recognize the classic corneal dystrophies (eg, map-dot-fingerprint dystrophy, lattice dystrophy, granular dystrophy, macular dystrophy, Fuchs dystrophy).**
6. Describe the fundamentals of ocular microbiology and recognize corneal and conjunctival inflammations and infections (eg, staphylococcal hypersensitivity, simple microbial keratitis, fungal corneal ulcers, trachoma, ophthalmia neonatorum, herpes zoster ophthalmicus, herpes simplex keratitis, adenovirus keratoconjunctivitis and conjunctivitis).**
7. Describe the basic principles of ocular pharmacology of anti-infective, anti-inflammatory, and immune modulating agents (eg, indications and contraindications for topical corticosteroids, nonsteroidal anti-inflammatory agents, and antibiotics).**
8. Recognize and treat lid margin disease (eg, staphylococcal blepharitis, meibomian gland dysfunction).**
9. Describe the basic differential diagnosis of acute and chronic conjunctivitis or red eye (eg, scleritis, episcleritis, conjunctivitis, orbital cellulitis, gonococcal and chlamydial conjunctivitis).**
10. Recognize and treat pyogenic granuloma.**
11. Recognize the basic presentations of ocular allergy (eg, phlyctenules, seasonal hay fever, vernal conjunctivitis, allergic and atopic conjunctivitis, giant papillary conjunctivitis).**
12. Understand the mechanisms of ocular immunology and recognize the external manifestations of anterior segment inflammation (eg, red eye associated with acute and chronic iritis).**
13. Describe the symptoms, signs, testing, and evaluation for dry eye (eg, Schirmer test, tarsorrhaphy); and treatment for dry eye.**
14. Describe the etiologies and treatment of superficial punctate keratopathy (eg, dry eye, Thygeson superficial punctate keratopathy, neurotrophic keratitis, blepharitis, toxicity, ultraviolet photo keratopathy, contact lens-related keratitis).**
15. Recognize and describe the etiologies of hyphema and microhyphema.**
16. Describe the basic mechanisms of traumatic and toxic injury to the anterior segment and treatment (eg, chemical and thermal burns, lid laceration, orbital fracture).**
17. Recognize corneal lacerations (perforating and nonperforating), anterior segment trauma, corneal and conjunctival foreign bodies.**
18. Describe the epidemiology, differential diagnosis, evaluation, and management of common benign and malignant lid lesions, including pigmented lesions of the conjunctiva and lid (eg, nevi, melanoma, primary acquired melanosis, ocular surface squamous neoplasia).**

B. Technical/Surgical Skills

1. Perform external examination (illuminated and magnified) and slit-lamp biomicroscopy, including drawing of anterior segment findings.**
2. Administer topical anesthesia, as well as special topical stains of the cornea (eg, fluorescein dye and rose bengal).**
3. Perform tests for dry eye (eg, Schirmer test, tear film breakup, and dye disappearance).**
4. Perform punctal occlusion (temporary or permanent) or insert plugs.**
5. Perform simple corneal sensation testing (eg, cotton-tipped swab).**
6. Perform tonometry (eg, applanation, Tono-Pen, Schiøtz, pneumotonometry).**
7. Perform techniques of sampling for viral, bacterial, fungal, and protozoal ocular infections (eg, corneal scraping and appropriate culture techniques).**
8. Interpret simple stains of the cornea and conjunctiva (eg, Gram stain, Giemsa stain).**
9. Manage corneal epithelial defects (eg, pressure patching and bandage contact lenses).**
10. Perform removal of a conjunctival or corneal foreign body (eg, rust ring).**

11. Perform simple (nonrecurrent) pterygium excision (eg, with autologous conjunctival transplantation).**
12. Perform an isolated corneal laceration repair (eg, linear laceration not extending to limbus, not involving uveal or intraocular structures).**
13. Perform epilation.**
14. Perform a lateral tarsorrhaphy.**
15. Perform incision, drainage, and/or remove a primary chalazion/stye.**
16. Perform irrigation of chemical burn to the eye.**
17. Perform Seidel test.**

Standard Level Goals:

A. Cognitive Skills

1. Describe the more complex anatomy, embryology, physiology, pathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa.
2. Describe the more complex congenital abnormalities of the cornea, sclera, anterior segment and globe and their associated systemic manifestations (eg, Axenfeld, Rieger, and Peter anomalies, aniridia, hamartomas and choristomas).
3. Understand more complex corneal optics and refraction (eg, irregular astigmatism, keratoconus, anisometropia).
4. Correlate the concordance of the visual acuity with the density of media opacity (eg, cataract, corneal scars, edema), and evaluate the etiology of discordance between acuity and findings from examination of the media.
5. Recognize and treat less common corneal or conjunctival presentations of degenerations and common conjunctival neoplasms (eg, inflamed, atypical, or recurrent pterygium, band keratopathy, benign and malignant tumors).
6. Describe the epidemiology, clinical features, pathology, evaluation, and treatment of peripheral corneal thinning disorders or ulceration (eg, Terrien marginal degeneration, Mooren ulcer, rheumatoid arthritis-related corneal melt, dellen).
7. Describe the epidemiology, differential diagnosis, evaluation, and management of vitamin A deficiency (eg, Bitot spot, dry eye, slowed dark adaptation) and neurotrophic corneal diseases.
8. Recognize and treat recurrent corneal erosions.
9. Recognize, evaluate, and treat chronic conjunctivitis (eg, chlamydia, trachoma, molluscum contagiosum, Parinaud oculoglandular syndrome, ocular rosacea).
10. Describe more complex ocular microbiology and describe the differential diagnosis of more complicated corneal and conjunctival infections (eg, complex, mixed, or atypical bacterial, fungal, Acanthamoeba, viral, or parasitic keratitis).
11. Describe the more complex principles of ocular pharmacology of anti-infective, anti-inflammatory, and immune modulating agents (eg, use of topical nonsteroidal and steroidal agents, cyclosporine, and anti-tumor necrosis factor agents).
12. Describe the differential diagnosis, evaluation, and management of Thygeson superficial punctate keratopathy.
13. Describe more complex differential diagnosis of red eye (eg, autoimmune and inflammatory disorders causing scleritis, episcleritis, conjunctivitis, orbital cellulitis).
14. Describe key features of trachoma, including epidemiology, clinical features, staging, and its complications (eg, cicatrization), prevention (eg, facial hygiene), and topical and systemic antibiotic treatment (especially in hyperendemic regions), and surgery (eg, tarsal rotation).
15. Describe differential diagnosis, evaluation, and treatment of interstitial keratitis (eg, syphilis, viral diseases, noninfectious, immunologic, inflammation).
16. Describe the differential diagnosis and the external manifestations of more complex anterior segment inflammation (eg, acute and chronic iritis with and without systemic disease).
17. Recognize, evaluate, and treat the ocular complications of severe diseases, such as chronic exposure keratopathy, contact dermatitis, and rosacea.
18. Describe the clinical features, pathology, evaluation, and treatment of ocular cicatricial pemphigoid and Stevens-Johnson syndrome.
19. Describe the classification, pathology, indications for surgery, and prognosis of common eyelid abnormalities (eg, blepharoptosis, trichiasis, distichiasis, essential blepharospasm, entropion, ectropion) and understand their relationship to secondary diseases of the cornea and conjunctiva (eg, exposure keratopathy).
20. Recognize and treat foreign body, animal, and plant substance injuries and understand the risk of injury with organic material.
21. Describe more complex mechanisms of traumatic and toxic injury to the anterior segment (eg, long-term sequelae of acid and alkali burn, complex lid laceration involving the lacrimal system, full-thickness laceration).

22. Recognize and treat corneal lacerations (perforating and nonperforating).
23. Recognize and treat more complex hyphemas (eg, surgical indications, evacuation).
24. Recognize the anterior segment manifestations of systemic diseases (eg, Wilson disease) and pharmacologic side effects (eg, amiodarone vortex keratopathy).
25. Recognize and treat common and uncommon benign and malignant lid lesions.

B. Technical/Surgical Skills

1. Perform more advanced techniques, including keratometry, keratoscopy, endothelial cell count and/or evaluation, specular microscopy, and pachymetry.**
2. Perform stromal micropuncture.**
3. Perform application of corneal glue.**
4. Perform simple keratectomy and lamellar keratectomy.**
5. Assist in more complex corneal surgery (eg, penetrating keratoplasty and lamellar keratoplasty).**
6. Perform more complex and recurrent pterygium excision, including conjunctival grafting.**
7. Perform more complex lid laceration repair.**
8. Perform more complex corneal laceration repair (eg, stellate perforating laceration).**
9. Perform and interpret more complex stains of the cornea and conjunctiva (eg, calcofluor white, acid fast).
10. Repair simple lacerations of the lacrimal drainage apparatus (eg, perform intubations and primary closure).
11. Treat hyphema and microhyphema with associated increased intraocular pressure and/or blood staining (eg, surgical evacuation).

Advanced Level Goals:

A. Cognitive Skills

1. Describe the most complex anatomy, embryology, physiology, histopathology, microbiology, immunology, genetics, epidemiology, and pharmacology of the cornea, conjunctiva, sclera, eyelids, lacrimal apparatus, and ocular adnexa.
2. Understand the most complex corneal optics and refraction (eg, postkeratoplasty) and their methods of treatment (eg, contact lenses, refractive surgery).
3. Describe the most complex and less common congenital abnormalities of the cornea, sclera, and globe (eg, cornea plana, keratoglobus).
4. Recognize the less common corneal dystrophies and degenerations (eg, Meesman dystrophy, Reis-Buckler dystrophy, François syndrome, Schnyder crystalline dystrophy, congenital hereditary stromal dystrophy, congenital hereditary endothelial dystrophy, posterior polymorphous dystrophy) in addition to the more common dystrophies (eg, anterior membrane dystrophy, granular, lattice, and macular).
5. Recognize common and uncommon corneal and conjunctival neoplasms and degenerations (eg, spheroidal degeneration, carcinoma in situ).
6. Describe less common and rare ocular infections, and describe the differential diagnosis of the most complicated corneal and conjunctival infections (eg, amoebas, leishmaniasis, nematodes).
7. Describe the most complex principles of ocular pharmacology of anti-infective, anti-inflammatory, and immune modulating agents (eg, combination therapies of antiviral and anti-inflammatory agents).
8. Describe the most complex differential diagnosis of red eye (eg, pemphigoid, pemphigus, Stevens-Johnson syndrome).
9. Describe the differential diagnosis and the external manifestations of the most complex or uncommon anterior segment inflammations (eg, syphilitic keratouveitis).
10. Diagnose and treat the most complex traumatic and toxic injuries to the anterior segment (eg, total lid avulsion, severe alkali burn).
11. Recognize and treat complex corneal lacerations (eg, lacerations extending beyond the limbus, uveal involvement).
12. Diagnose and treat the most severe corneal exposure cases (eg, conjunctival flap).
13. Describe the indications for ocular surface transplantation, including conjunctival autograft/flap, amniotic membrane transplantation, and limbal stem cell transplantation.
14. Describe the surgical indications (eg, Fuchs dystrophy, aphakic/pseudophakic bullous keratopathy, keratoconus), surgical techniques, and recognition and management of postoperative complications (especially immunologically-mediated rejection) of corneal transplantation (eg, penetrating, lamellar).

B. Technical/Surgical Skills

1. Perform and interpret the most advanced corneal techniques (eg, endothelial microscopy, computerized corneal topography and tomography, anterior segment ocular coherence tomography).**
2. Perform a thin conjunctival flap (eg, Gunderson flap).

3. Perform specialized and complicated fitting of contact lenses (eg, postkeratoplasty, advanced keratoconus).
4. Perform more complex corneal surgery (eg, penetrating or lamellar keratoplasty, keratorefractive procedures, and phototherapeutic keratectomy), and understand the postoperative management including postkeratoplasty astigmatism management and graft rejection.
5. Perform other complex conjunctival surgery (eg, autograft, stem cell transplant).
6. Manage and treat more complex neoplasms of the conjunctiva (eg, carcinoma, melanoma).

Very Advanced Level Goals: Subspecialist

Fellowship training requires more in-depth education about the pathophysiology and management than can usually be obtained in residency training in ophthalmology. Fellowships include a continuous period of intense and focused training in developing and maintaining knowledge, skills, scholarship, and professionalism. A fellow should be knowledgeable and proficient in all the activities listed for residency training. Subspecialty fellowship training should include a more in-depth exposure and understanding of the diagnosis and medical management of diseases of the eyelids, conjunctiva, cornea/sclera, and anterior ocular segment, as well as recognition and treatment of posterior segment disease that may affect the anterior segment. Subspecialty fellowship training should include hands-on training covering surgery of the conjunctiva, cornea/sclera, anterior segment, lens, and anterior vitreous, with special emphasis on corneal transplantation and related procedures. The fellow should be exposed to opportunities to develop research skills. A specific block of time may be set aside for clinical or laboratory research.

A. Cognitive Skills

1. Recognize acute and chronic blepharitis, including both infectious and noninfectious etiologies, with emphasis on microbial blepharitis, meibomian gland dysfunction, and rosacea.**
2. Recognize acute and chronic conjunctivitis, neonatal conjunctivitis, chlamydial disease, adenoviral conjunctivitis, allergic conjunctivitis, and bacterial conjunctivitis.**
3. Recognize acute and chronic infectious keratitis including bacterial, viral, fungal, and parasitic, with emphasis on herpes simplex, herpes zoster, adenovirus, acanthamoeba, and contact lens-associated problems.**
4. Recognize noninfectious keratitis including marginal keratitis, central ulcerative keratitis, epitheliopathy, endothelialitis, and interstitial keratitis.**
5. Recognize anterior segment anomalies, including various anomalies associated with specific genetic abnormalities, corneal dystrophies, and corneal degenerations.**
6. Recognize autoimmune and immunologic diseases of the anterior segment including allergy, corneal graft rejection, and cicatrizing conjunctivitis.**
7. Recognize and be familiar with oral and topical immunosuppression and anti-allergy medications.**
8. Describe fundamentals of anterior segment anatomy, chemistry, physiology, and wound healing including tear formation and function, corneal topography/tomography, endothelial cell function, and maintenance of corneal clarity.**
9. Understand principles of anterior segment pharmacology including antimicrobial, anti-inflammatory, ocular hypotensive and immunosuppressive agents, with emphasis on bioavailability, mechanism of actions, relative efficacy, safety, and potential complications.**
10. Demonstrate fundamental knowledge of contact lens physiology, design and materials, and complications for both cosmetic and therapeutic use.**
11. Develop proficiency in performing diagnostic techniques including biomicroscopy, specular microscopy, corneal topography/tomography, vital stains of the ocular surface, corneal biopsy techniques and interpretation, and corneal pachymetry.**
12. Develop proficiency in medical and surgical management of corneal thinning and perforation, including techniques of pharmacological manipulation; and office procedures, such as application of tissue glue and therapeutic contact lenses.**
13. Demonstrate a detailed understanding of cornea and conjunctival pathology results and interpretation of ocular cultures.**
14. Complete an eye-banking curriculum, including a review of specific eye banking functions (recovery, processing, storage, evaluation, and distribution of tissue), donor eligibility, and donor selection.**
15. Demonstrate skill in use of reference material, including electronic searching and retrieval of relevant articles, monographs, and abstracts.**

B. Technical/Surgical Skills

1. Demonstrate skill in anterior segment surgery including eyelid, conjunctival, scleral, and corneal procedures, with emphasis on corneal protective procedures (eg, tarsorrhaphy), reconstruction of the ocular surface, surgical management of corneal erosions, and phototherapeutic keratectomy.**

2. Demonstrate skill in penetrating and lamellar keratoplasty, with emphasis on patient selection, surgical technique, and postoperative care including recognition and management of graft rejection and endophthalmitis and advanced techniques for lamellar and penetrating keratoplasty, including full thickness and lamellar transplants and endothelial keratoplasty.**
3. The fellow should receive instruction and develop surgical proficiency in both full-thickness penetrating keratoplasty and selective endothelial keratoplasty and lamellar keratoplasty. The faculty must participate as primary surgeon or assistant surgeon to the fellow in a sufficient number of surgical procedures to confirm the fellow's surgical judgment and skill.
4. The fellow should actively participate in the postoperative management in the majority of grafts where they are part of the surgical team.**
5. The fellow should have sufficient experience and demonstrate proficiency with other surgeries, including pterygium excision with graft, corneal and conjunctival biopsies, astigmatic keratotomies, and phototherapeutic keratectomy.**
6. The fellow should participate in the surgery of more complex conditions, including extensive conjunctival reconstruction, amniotic membrane transplantation, ocular surface neoplasia, and limbal stem cell transplantation.**
7. The fellow should have knowledge of different techniques of keratoprosthesis surgery.**
8. The fellow should be familiar with the use of mitomycin (and/or other chemotherapeutic agents) in corneal and conjunctival surgeries and recognize the appropriate application and potential side effects.**