

## Enhancing Readiness: Refractive Surgery in the Military

**Army Lt. Col. Gary Legault, M.D.**

Cornea/Refractive Surgeon  
Chair, DHA Refractive Surgery Board  
Brooke Army Medical Center

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***“Medically Ready Force...Ready Medical Force”***

# Presenter



**Army Lt. Col. Gary Legault, M.D.**

Cornea/Refractive Surgeon

DHA Refractive Surgery Board - Chair

Brooke Army Medical Center

San Antonio, Texas

# LTC Gary Legault, M.D.



- Uniformed Services University (USU) Class of 2009
- San Antonio Uniformed Services Health Education Consortium (SAUSHEC) Ophthalmology
- Cornea/Refractive Fellowship – Duke University
- Ophthalmology Residency Program Director
- Army Refractive Surgery Program Manager
- DHA Refractive Surgery Board Chair
- Director, Virtual Medical Center

# Disclosures



- LTC Legault has no relevant financial or non-financial relationships to disclose relating to the content of this activity;
- The views expressed in this presentation are those of the author and do not necessarily reflect the official policy or position of the Department of Defense, U.S. Army, Brooke Army Medical Center, nor the U.S. Government.
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- Commercial support was not received for this activity.

# Disclosures

- I am also a patient. I have had Photorefractive Keratectomy (PRK) and Laser Assisted in-situ Keratomileusis (LASIK)



Photo credits: Legault, 2021

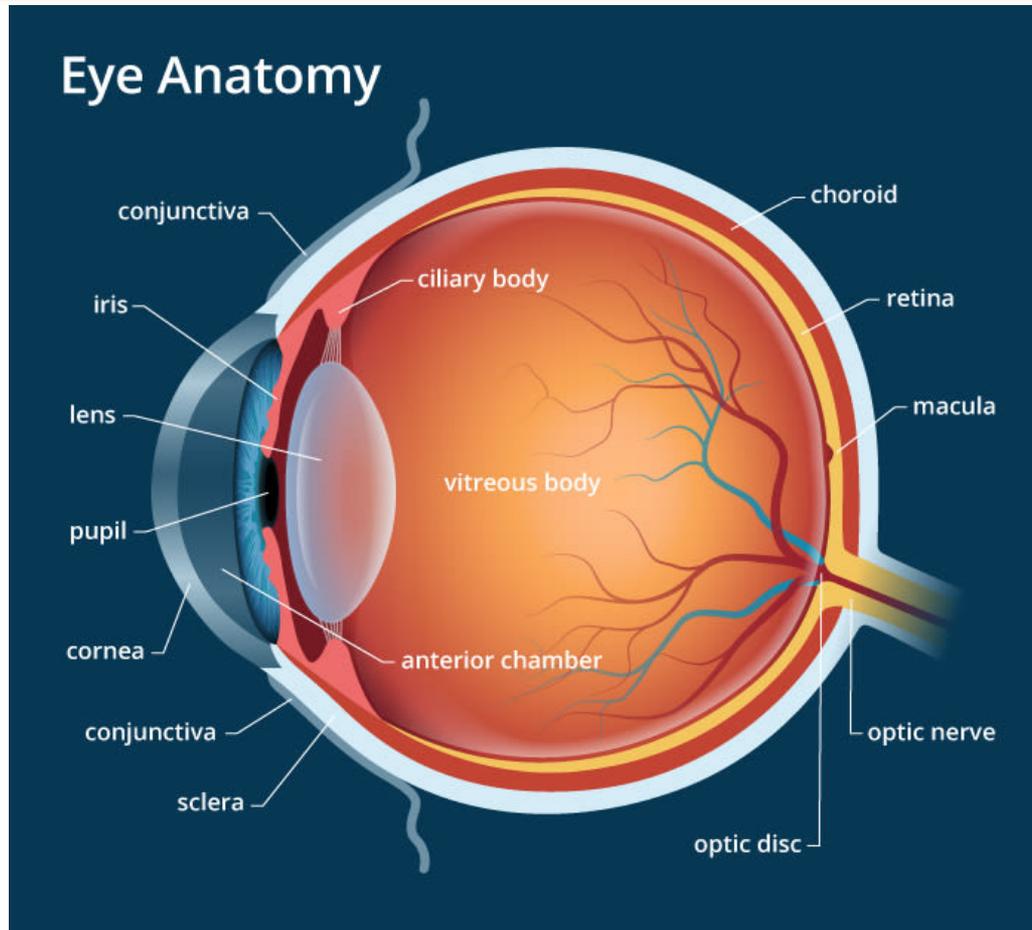
# Learning Objectives



At the conclusion of this activity, participants will be able to:

1. Compare the different types of refractive error.
2. Define refractive surgery.
3. Describe common refractive surgery procedures performed in the military.
4. List the benefits of refractive surgery
5. Recognize the eligibility criteria for surgery

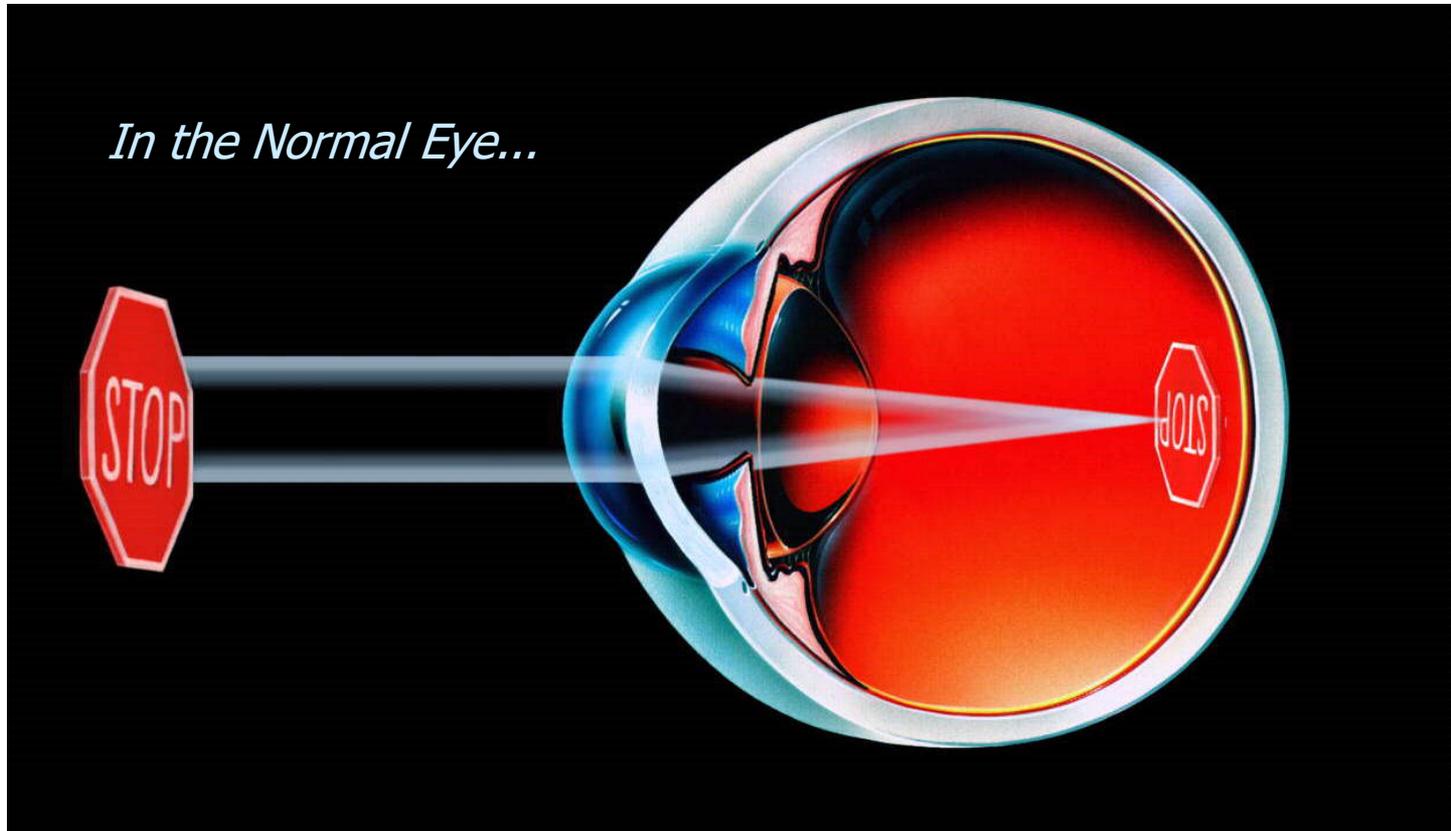
# Eye Anatomy



(allaboutvision.com, n.d.)

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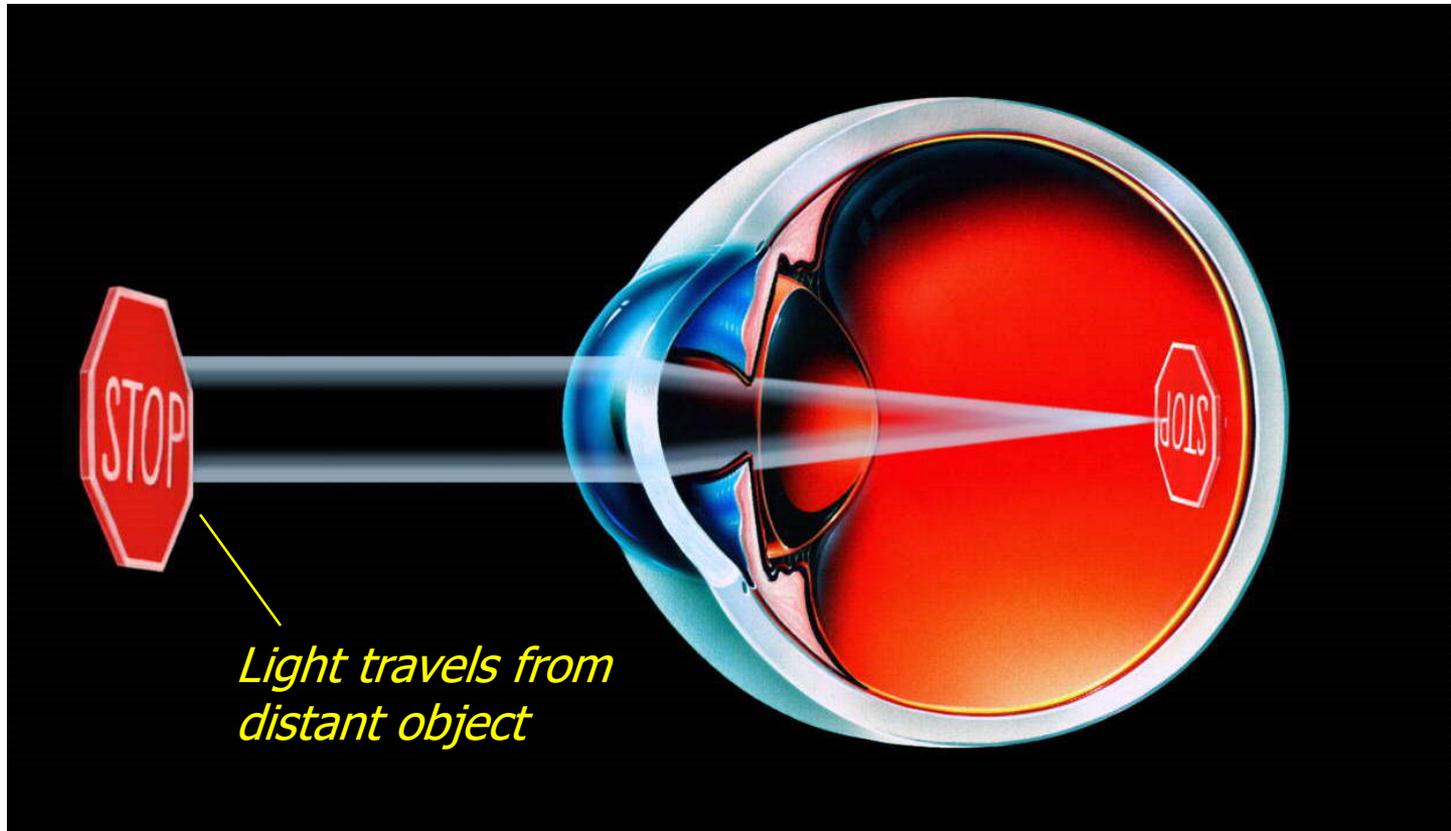
# Normal Eye



(Gordon S.F., n.d.)

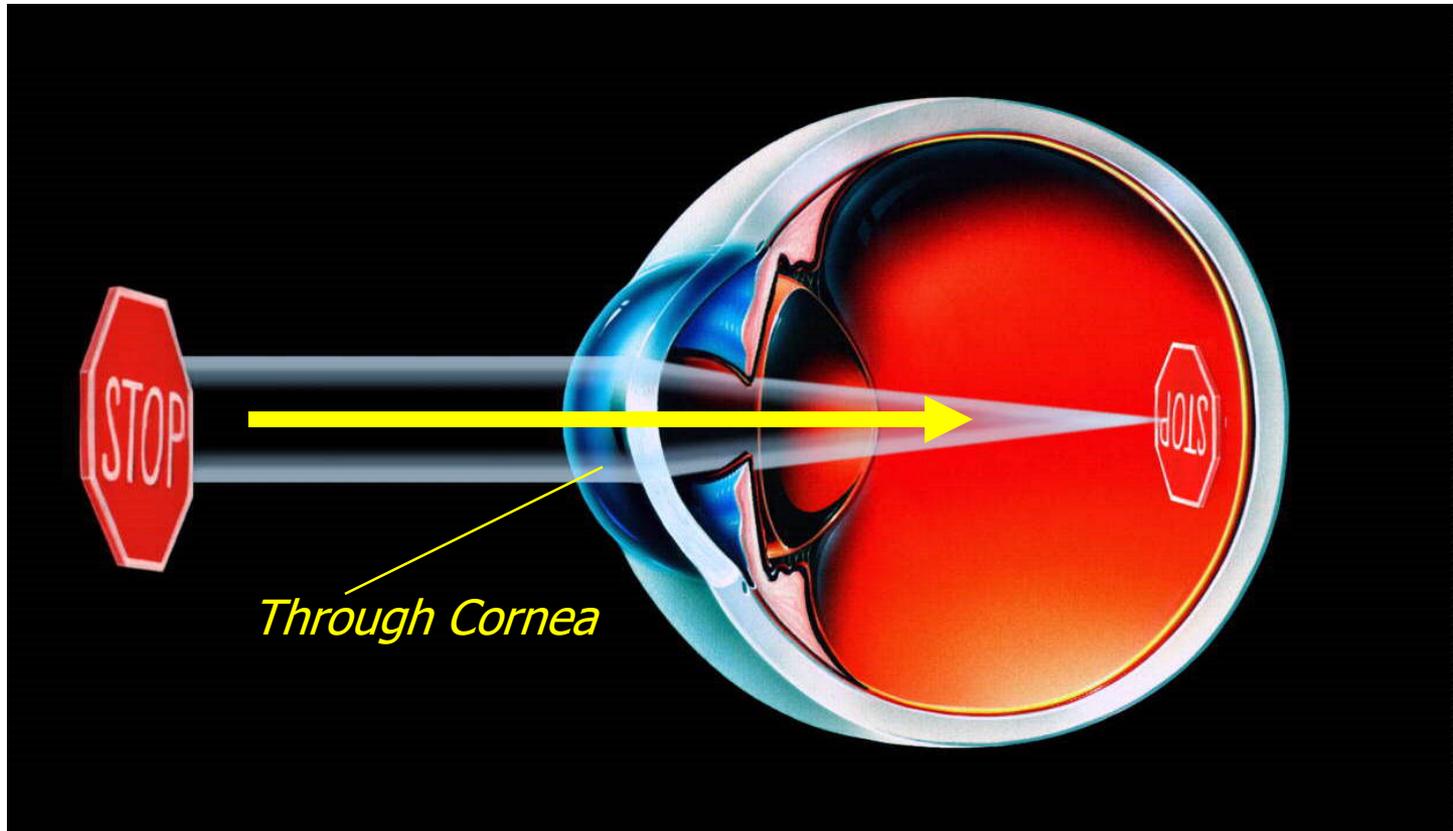
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# Normal Eye



(Gordon S.F., n.d.)

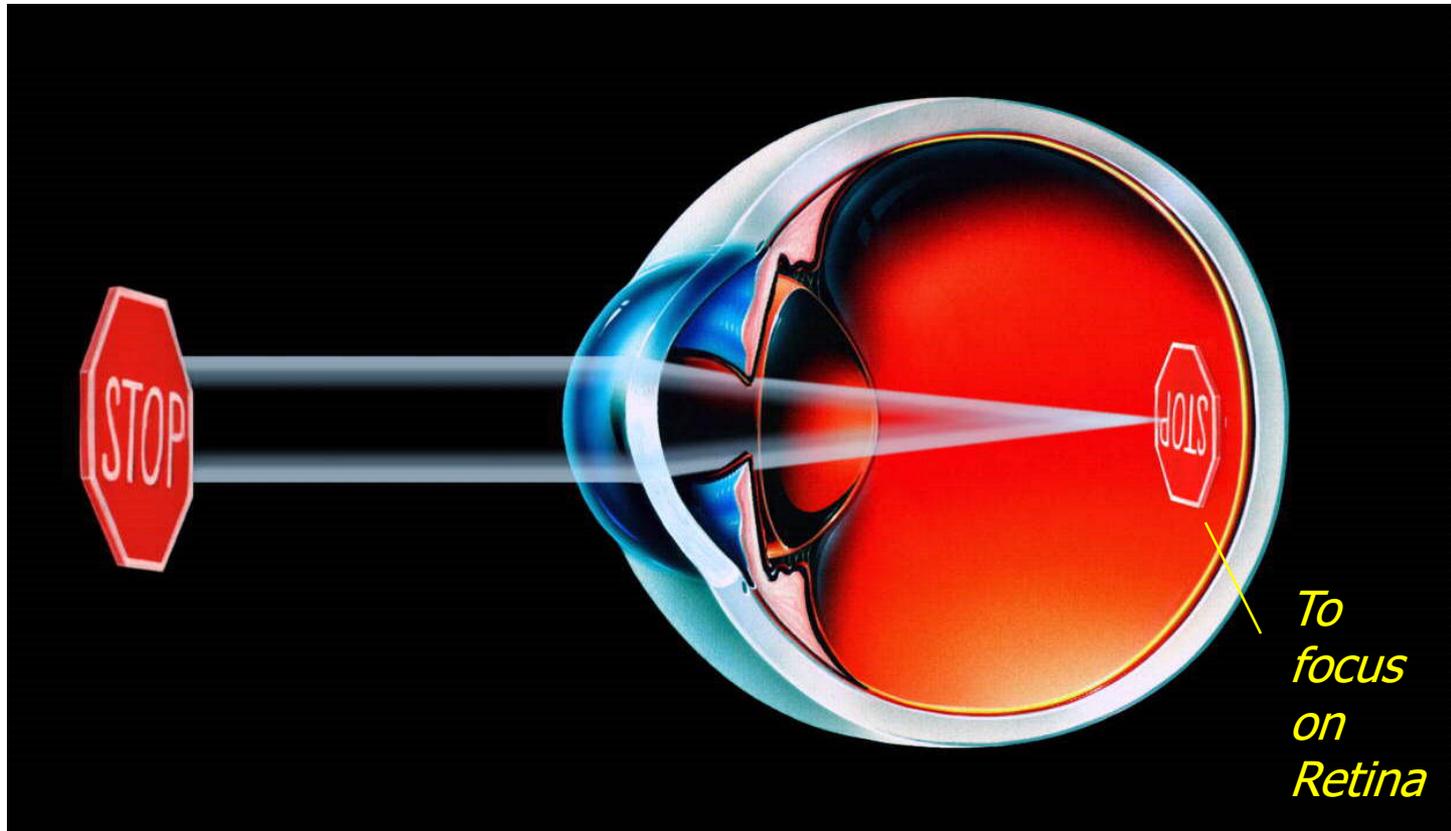
# Normal Eye



(Gordon S.F., n.d.)

***“Medically Ready Force...Ready Medical Force”***

# Normal Eye



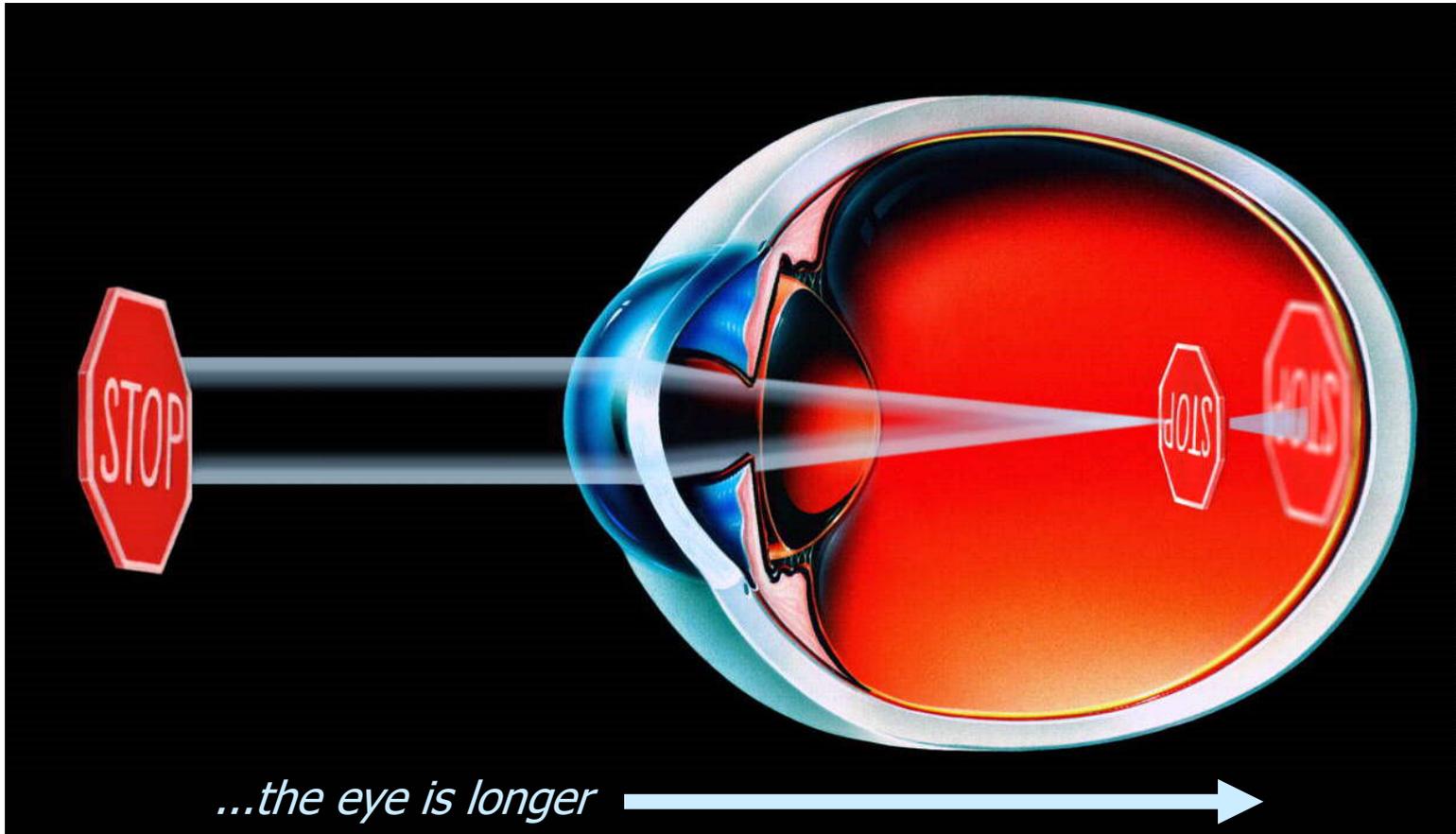
(Gordon S.F., n.d.)

# What is Refractive Error



- The eye cannot clearly focus the images from the outside world
  
- 4 Types:
  - Myopia (Nearsightedness)
  - Hyperopia (Farsightedness)
  - Astigmatism
  - Presbyopia

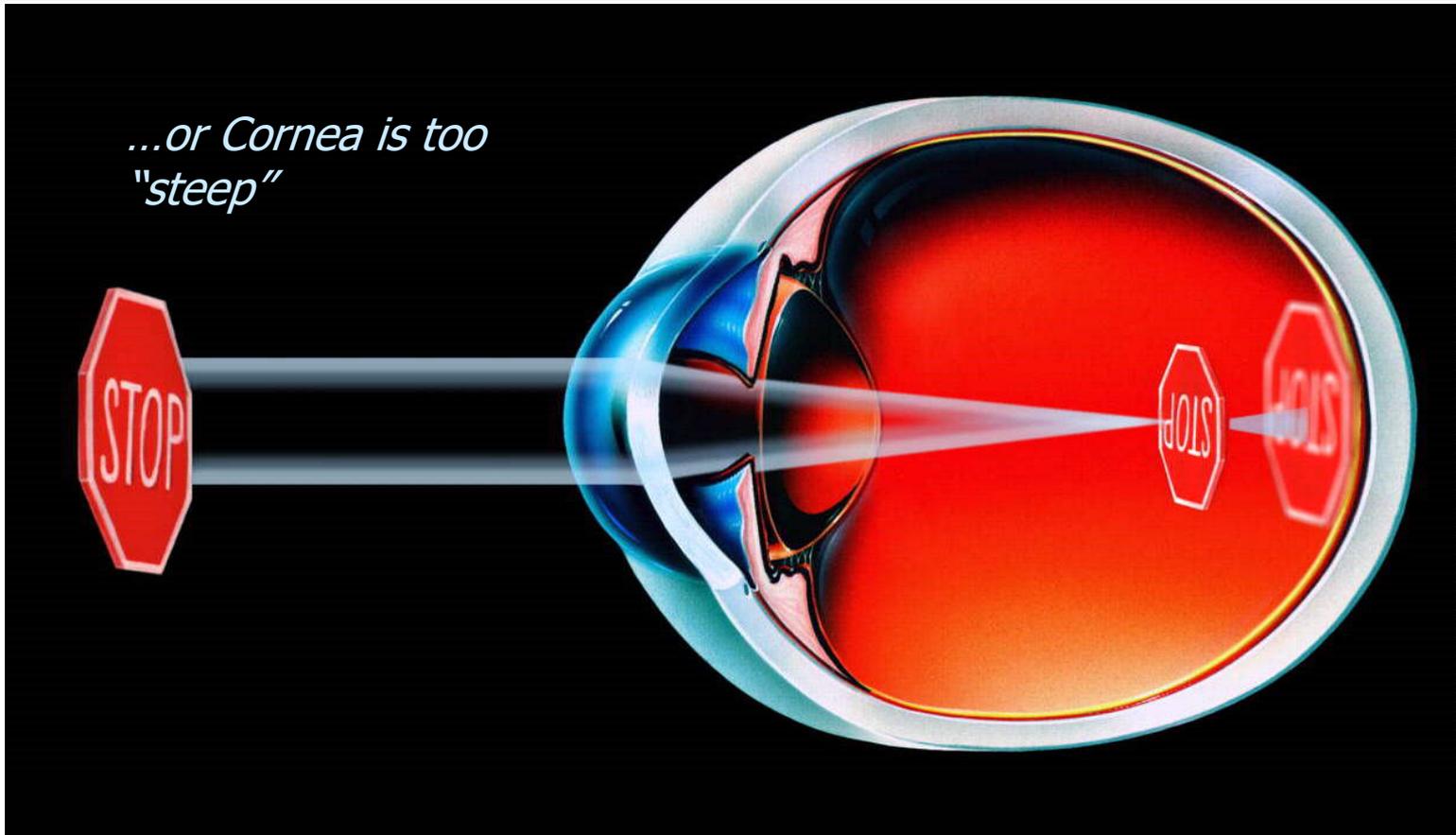
# Myopia (Nearsightedness)



(Gordon S.F., n.d.)

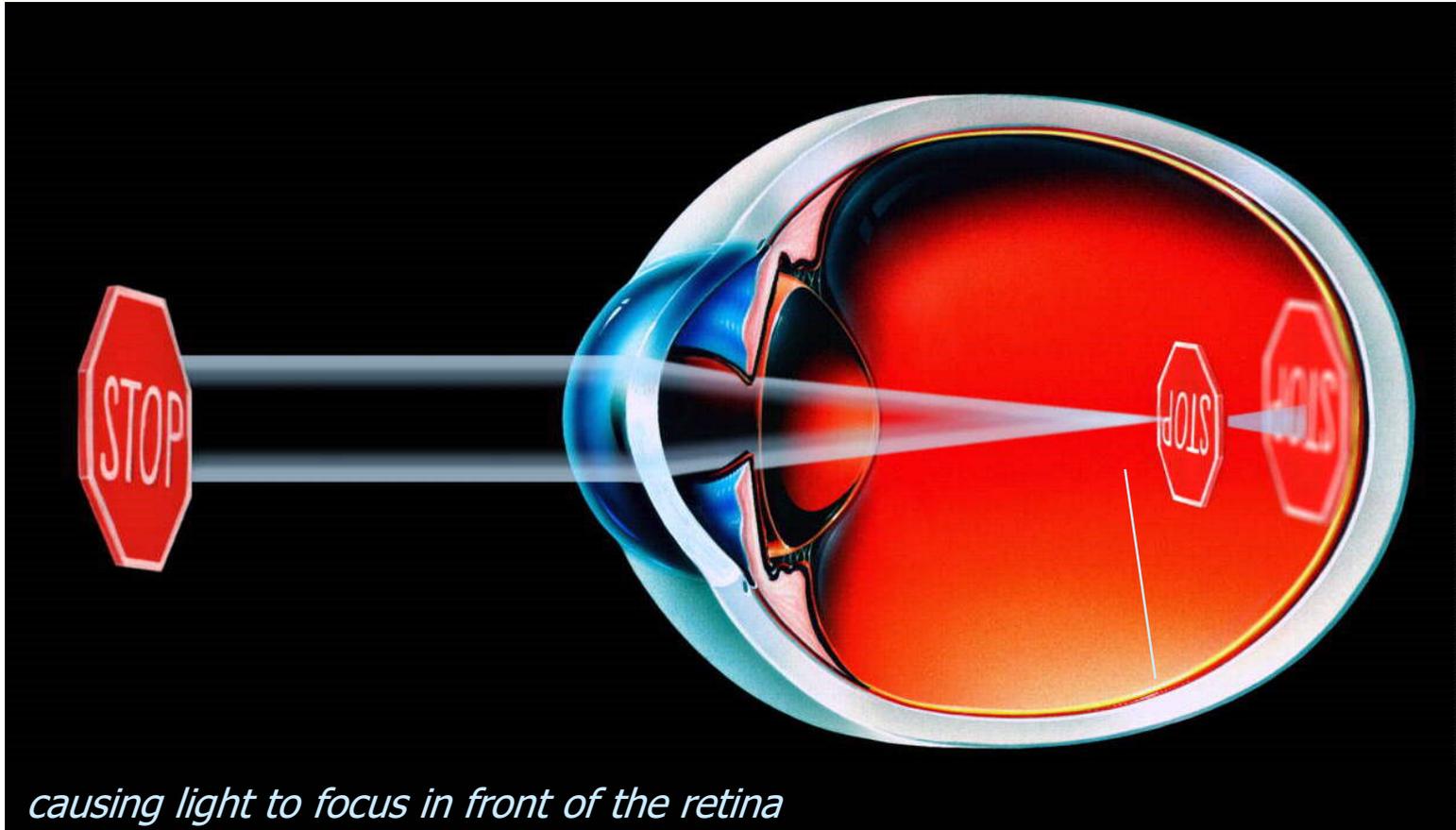
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# Myopia (Nearsightedness)



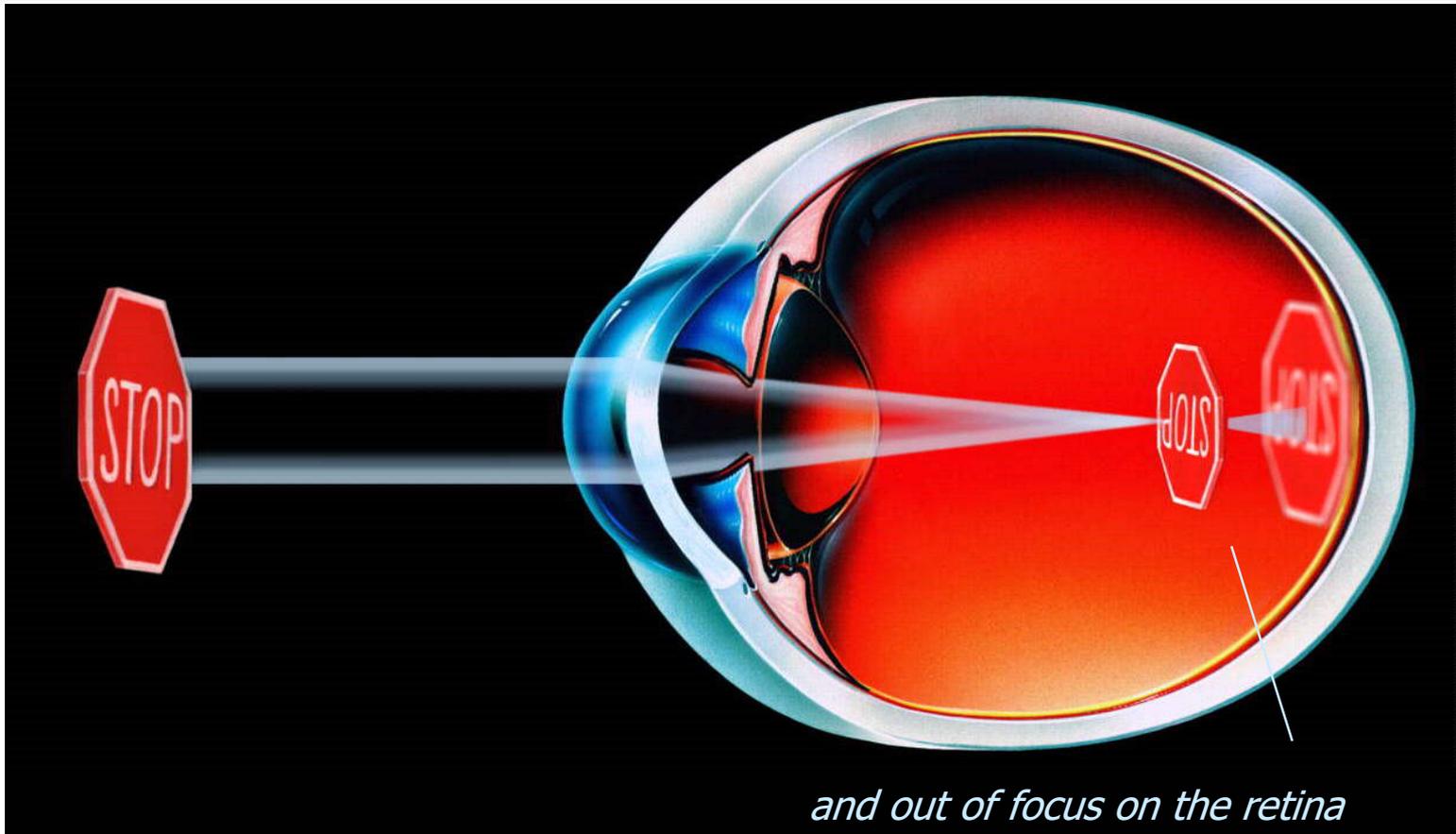
(Gordon S.F., n.d.)

# Myopia (Nearsightedness)



(Gordon S.F., n.d.)

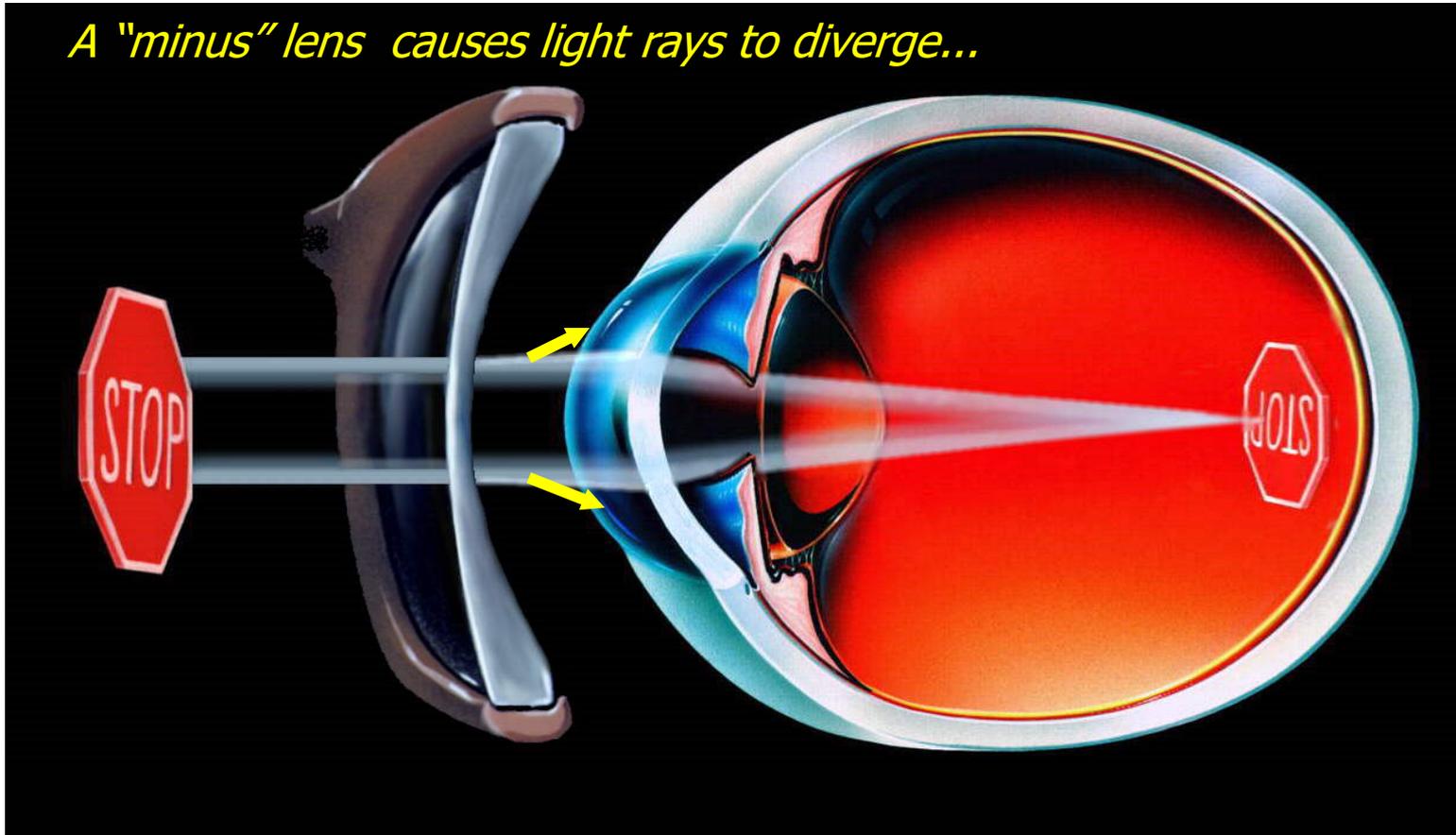
# Myopia (Nearsightedness)



(Gordon S.F., n.d.)

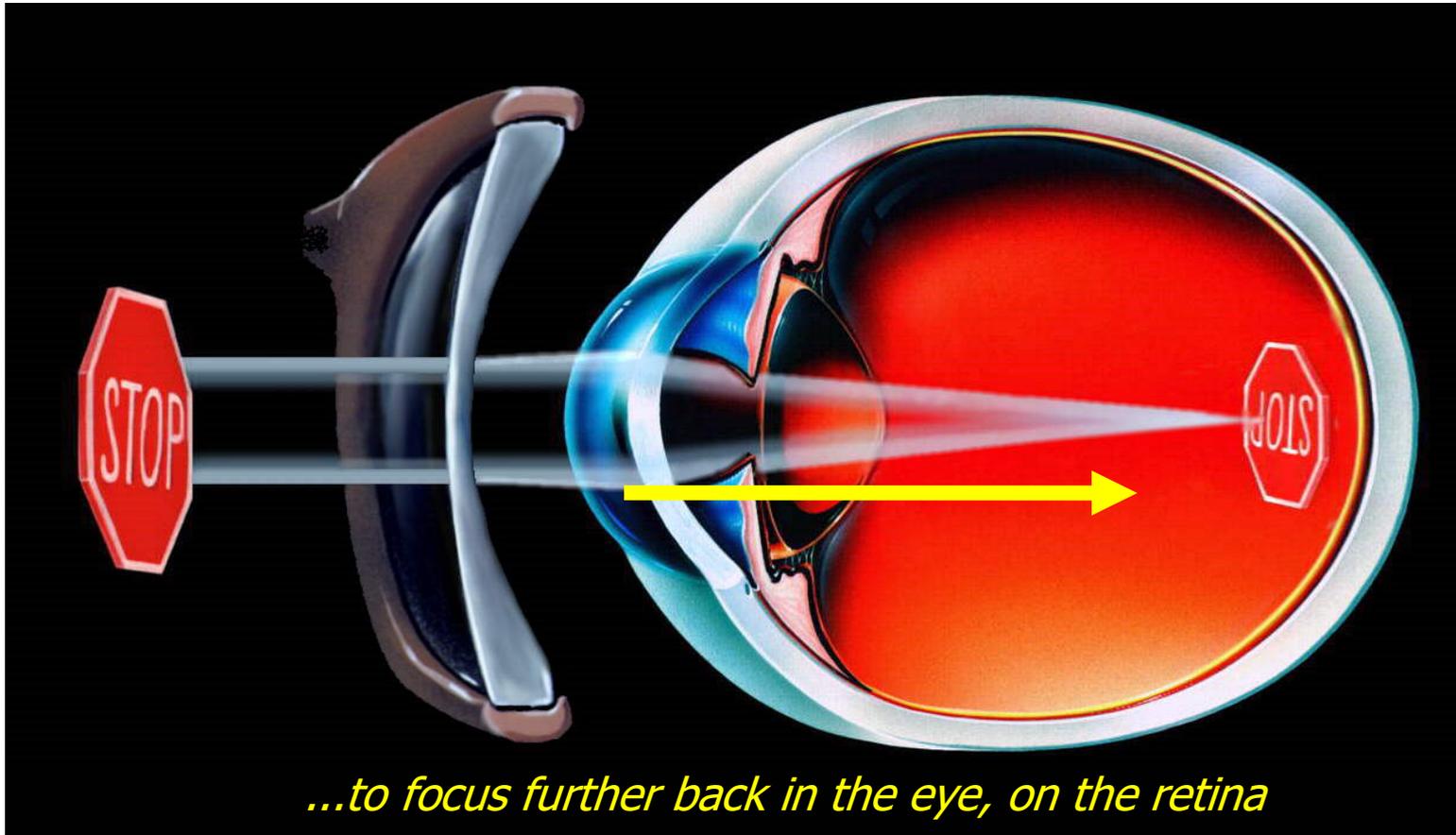
# Myopia (Nearsightedness)

*A "minus" lens causes light rays to diverge...*



(Gordon S.F., n.d.)

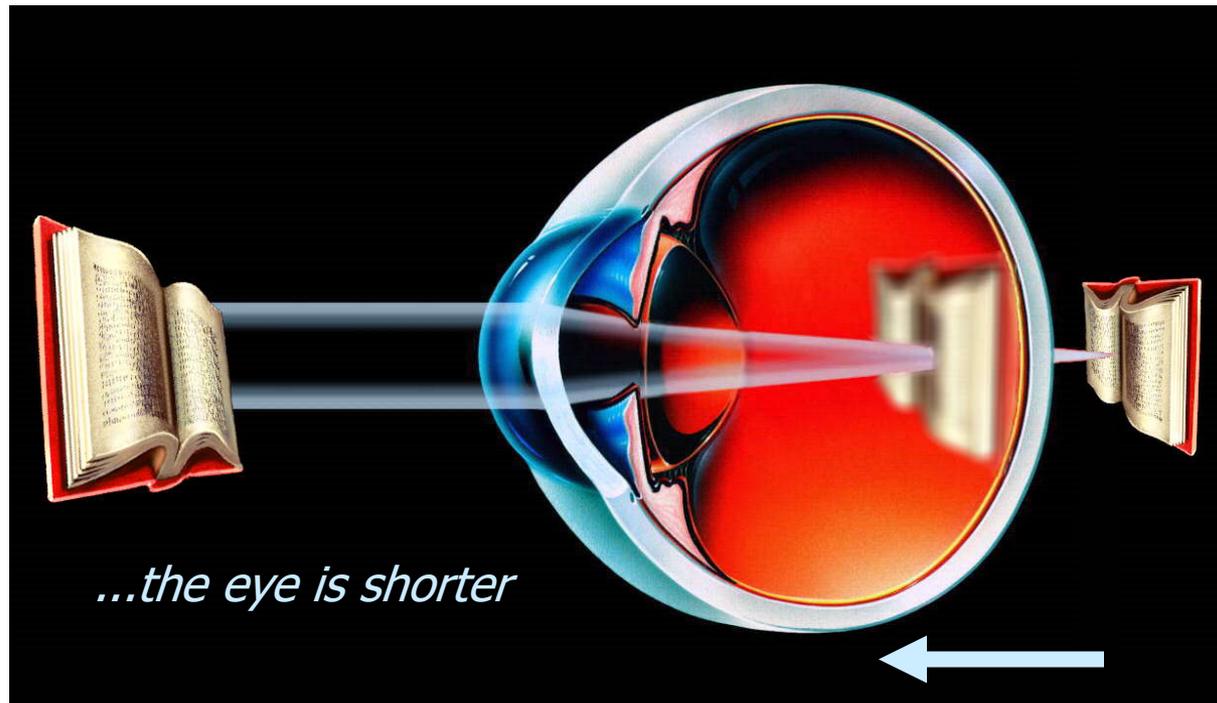
# Myopia (Nearsightedness)



*...to focus further back in the eye, on the retina*

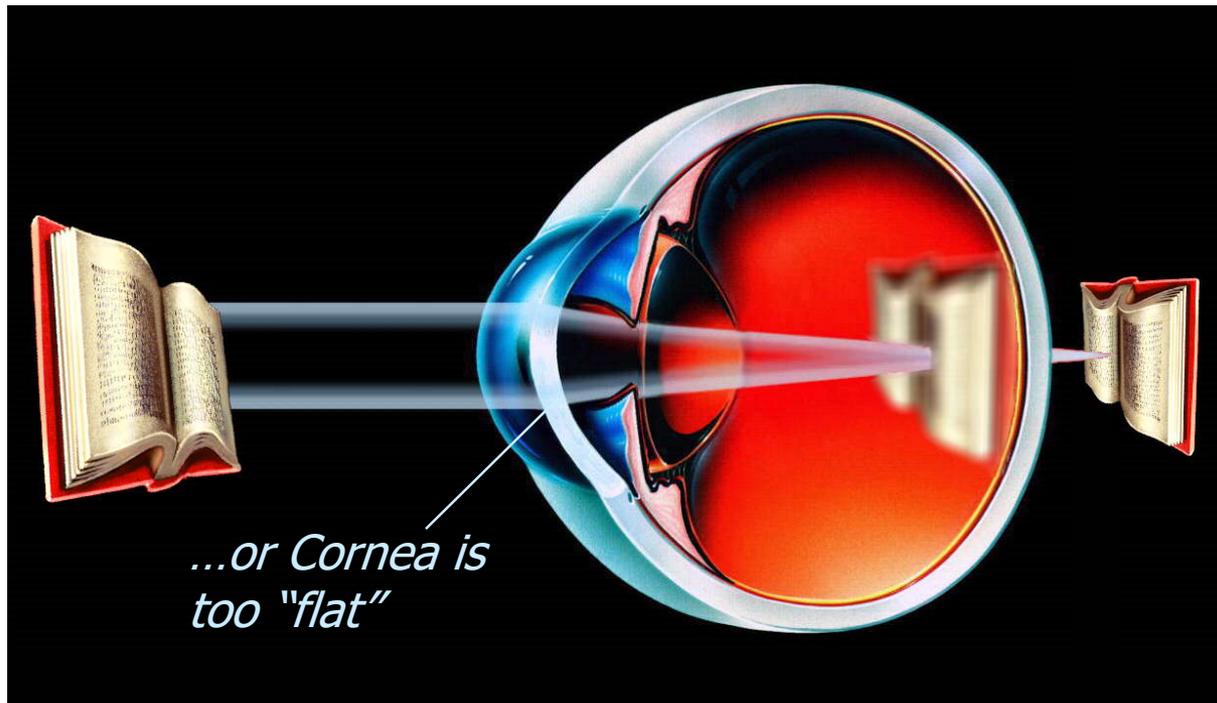
(Gordon S.F., n.d.)

# Hyperopia (Farsightedness)



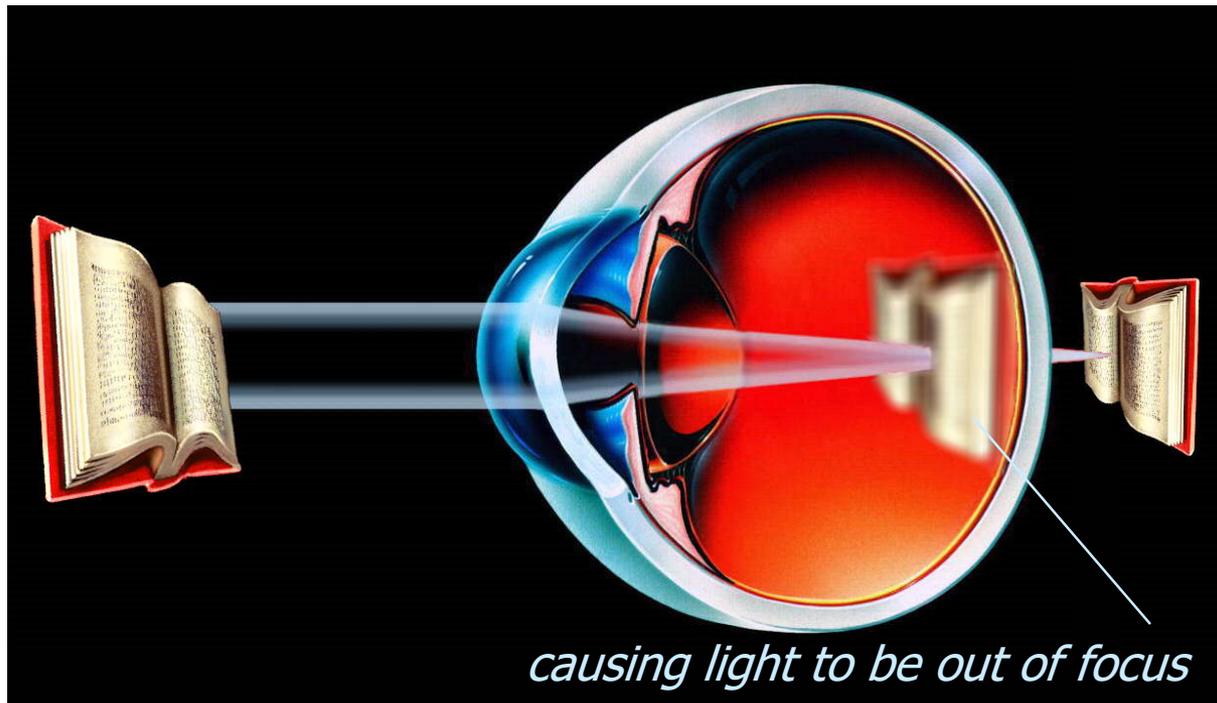
(Gordon S.F., n.d.)

# Hyperopia (Farsightedness)



(Gordon S.F., n.d.)

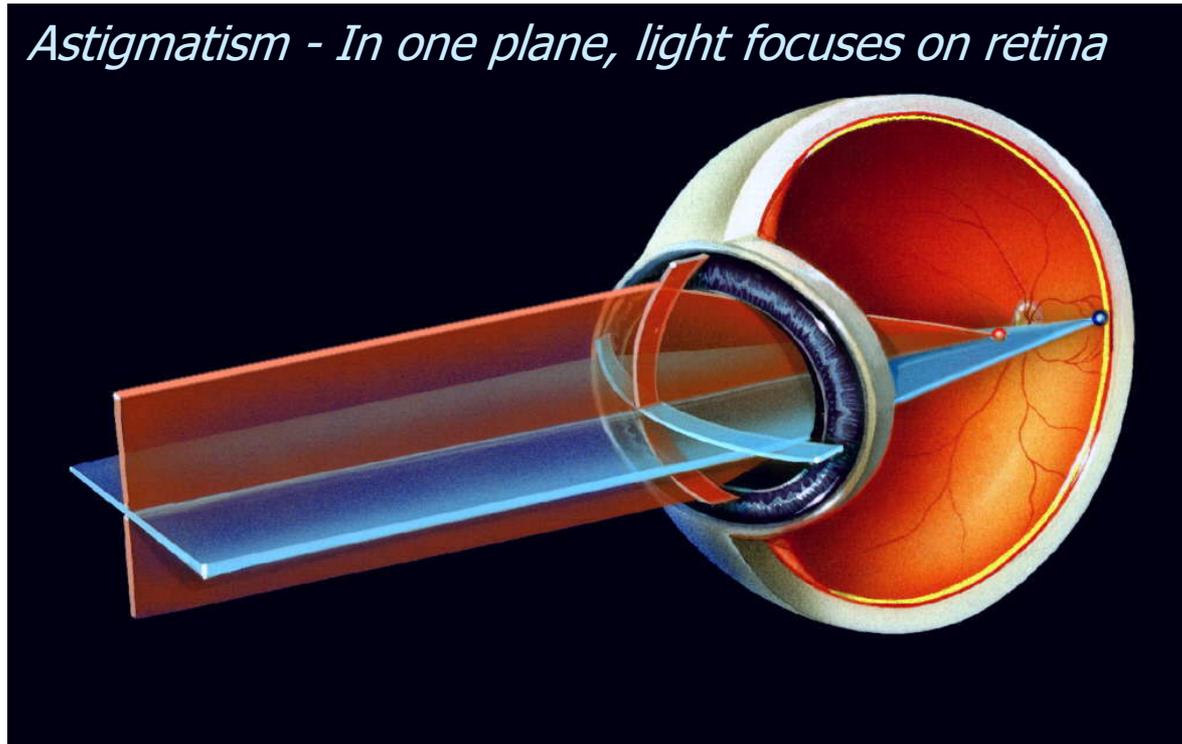
# Hyperopia (Farsightedness)



(Gordon S.F., n.d.)

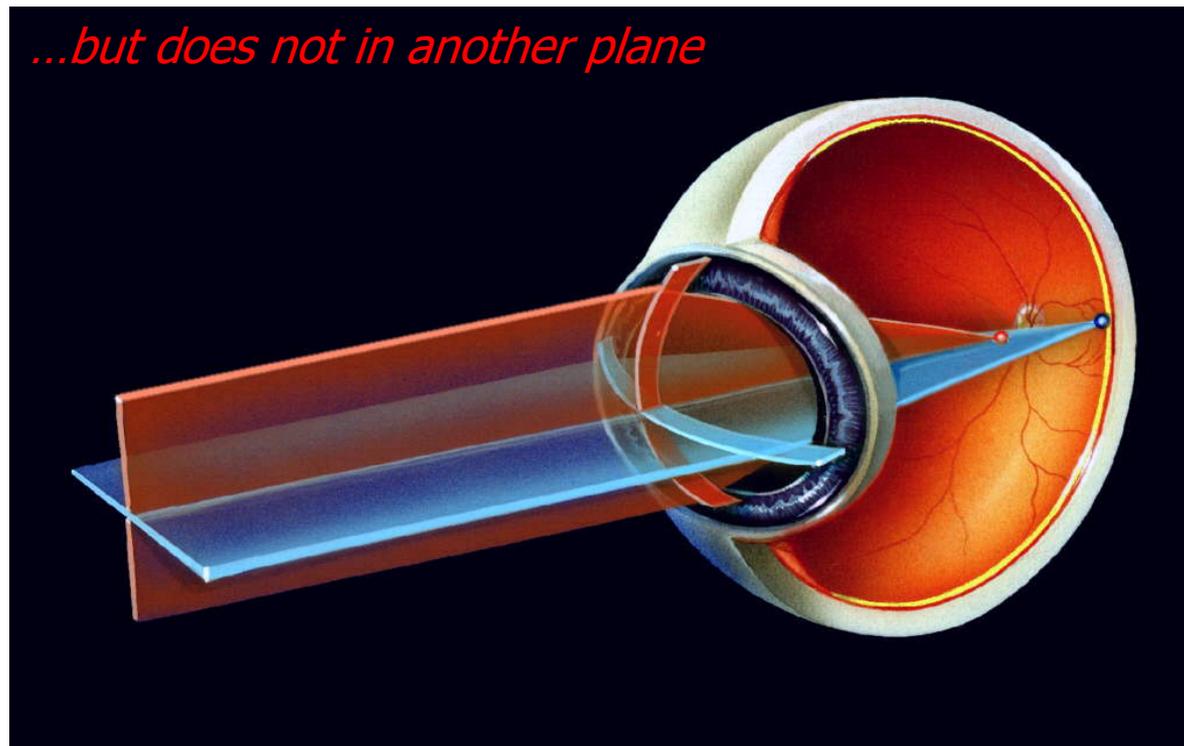
# Astigmatism

*Astigmatism - In one plane, light focuses on retina*



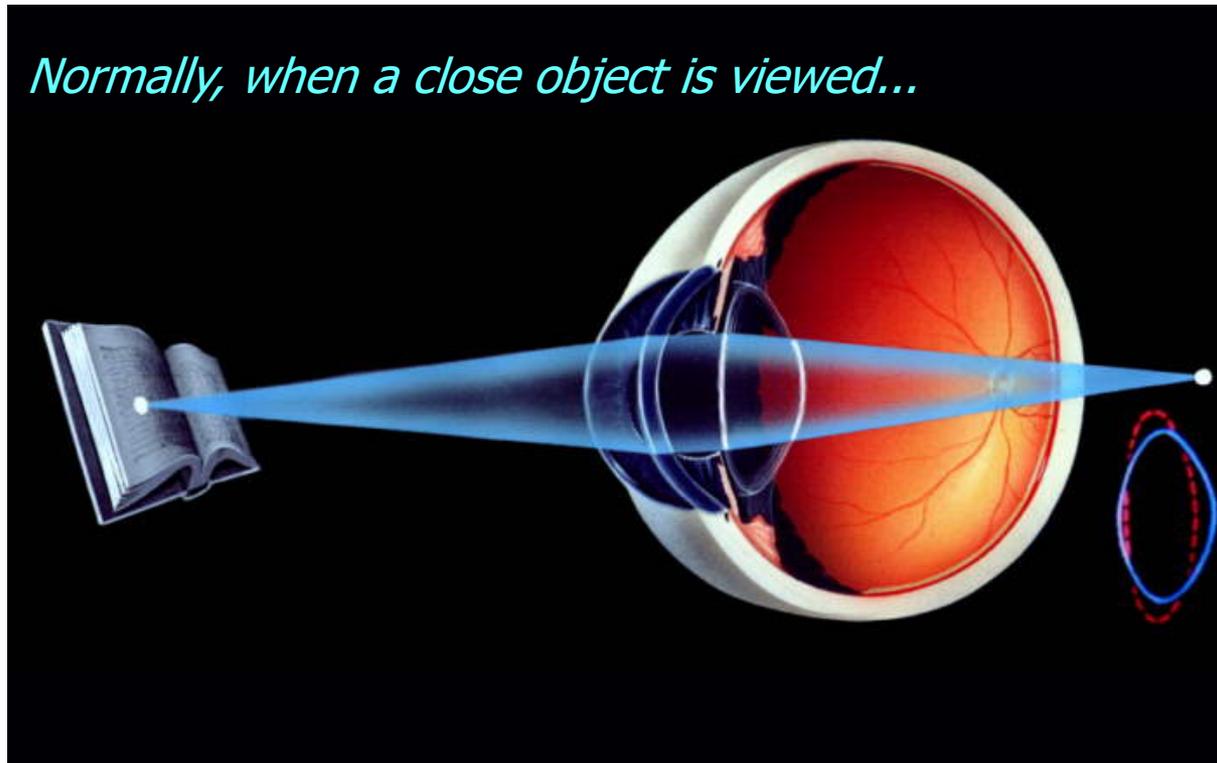
(Gordon S.F., n.d.)

# Astigmatism



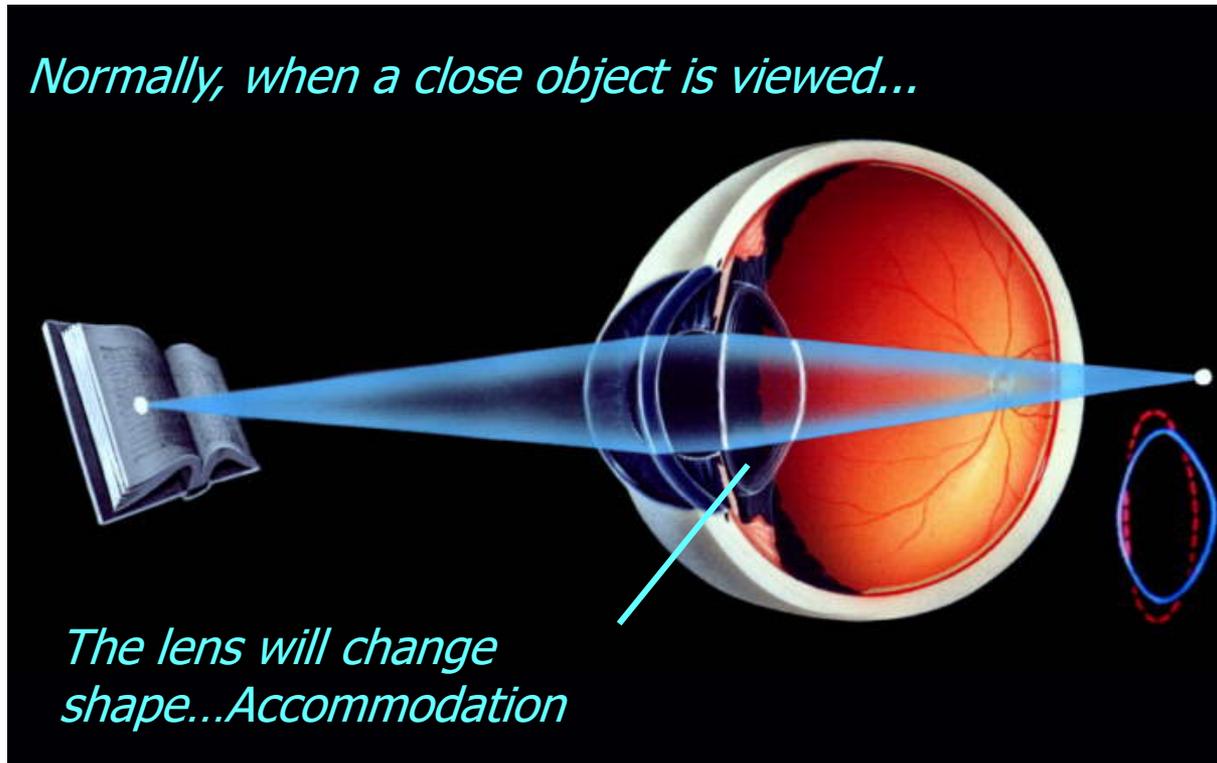
(Gordon S.F., n.d.)

# Presbyopia



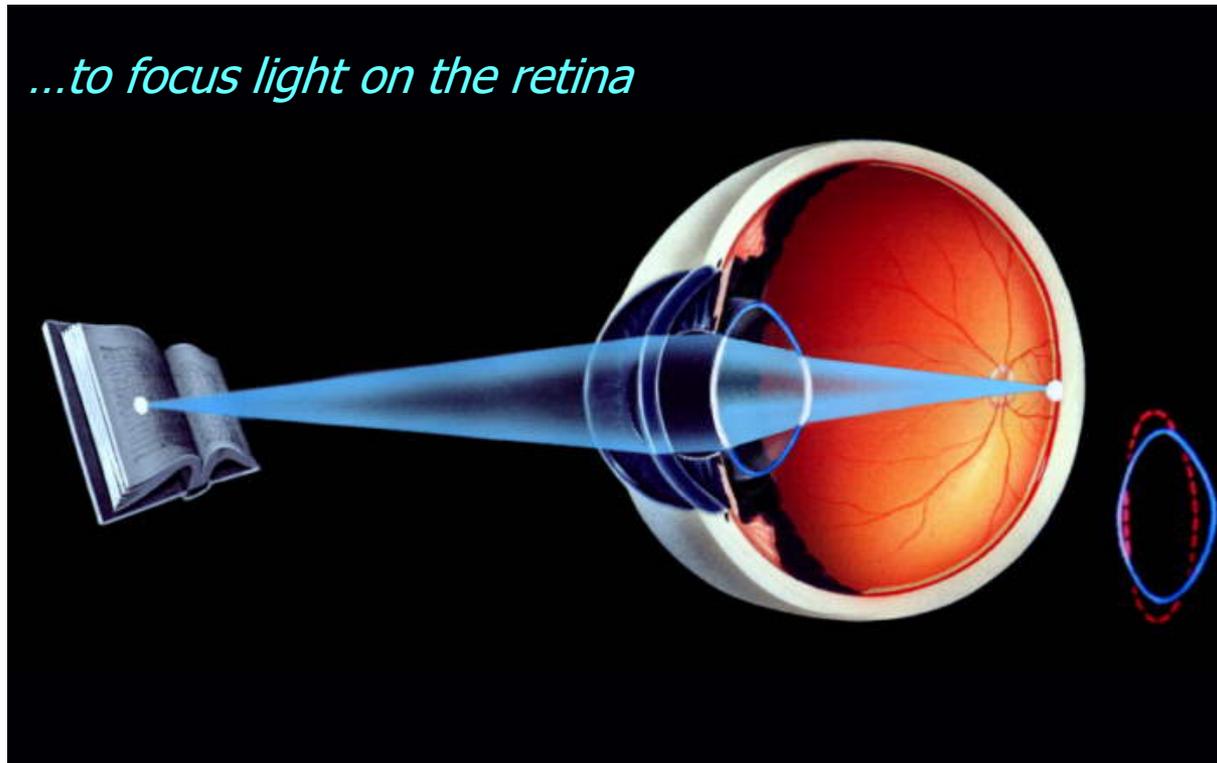
(Gordon S.F., n.d.)

# Presbyopia



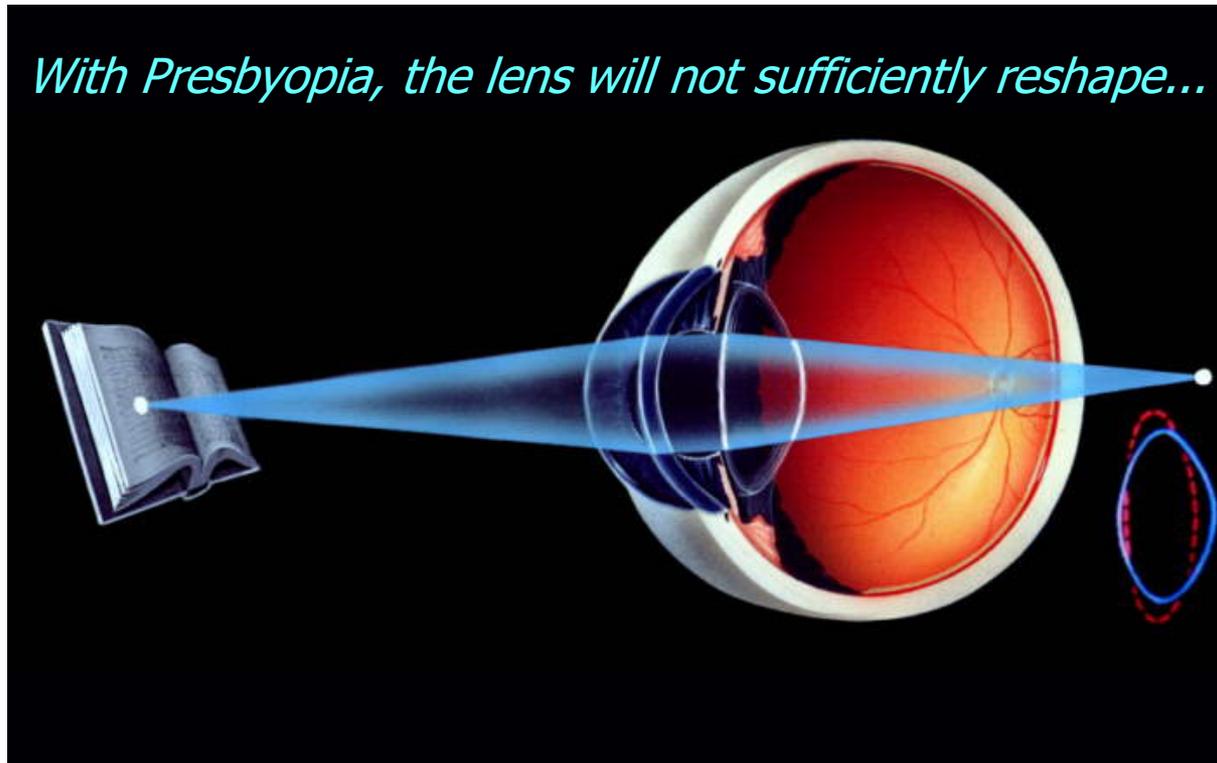
(Gordon S.F., n.d.)

# Presbyopia



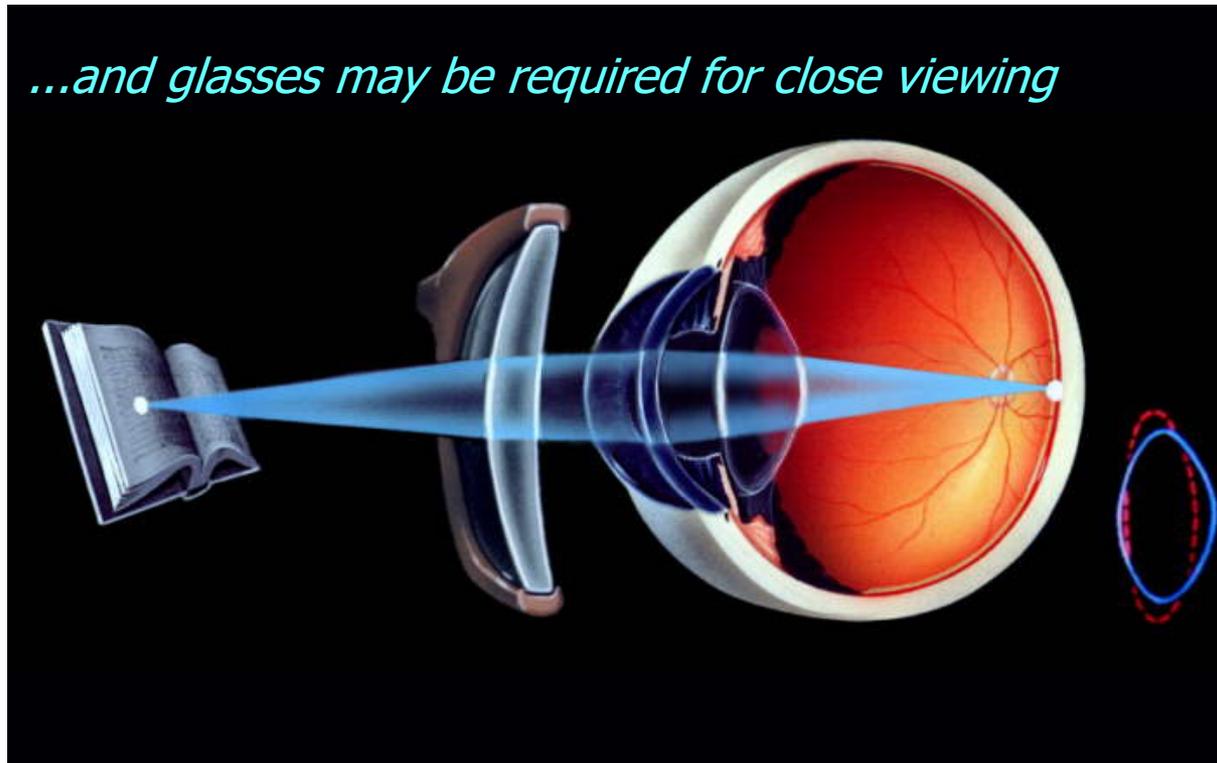
(Gordon S.F., n.d.)

# Presbyopia



(Gordon S.F., n.d.)

# Presbyopia



(Gordon S.F., n.d.)

# Presbyopia



- > 40-45 years – Decrease Near Focusing Ability (Accommodation)
- Key - After age 45  
WILL NOT BE ABLE TO READ  
WITHOUT GLASSES!

# How do you correct refractive error?

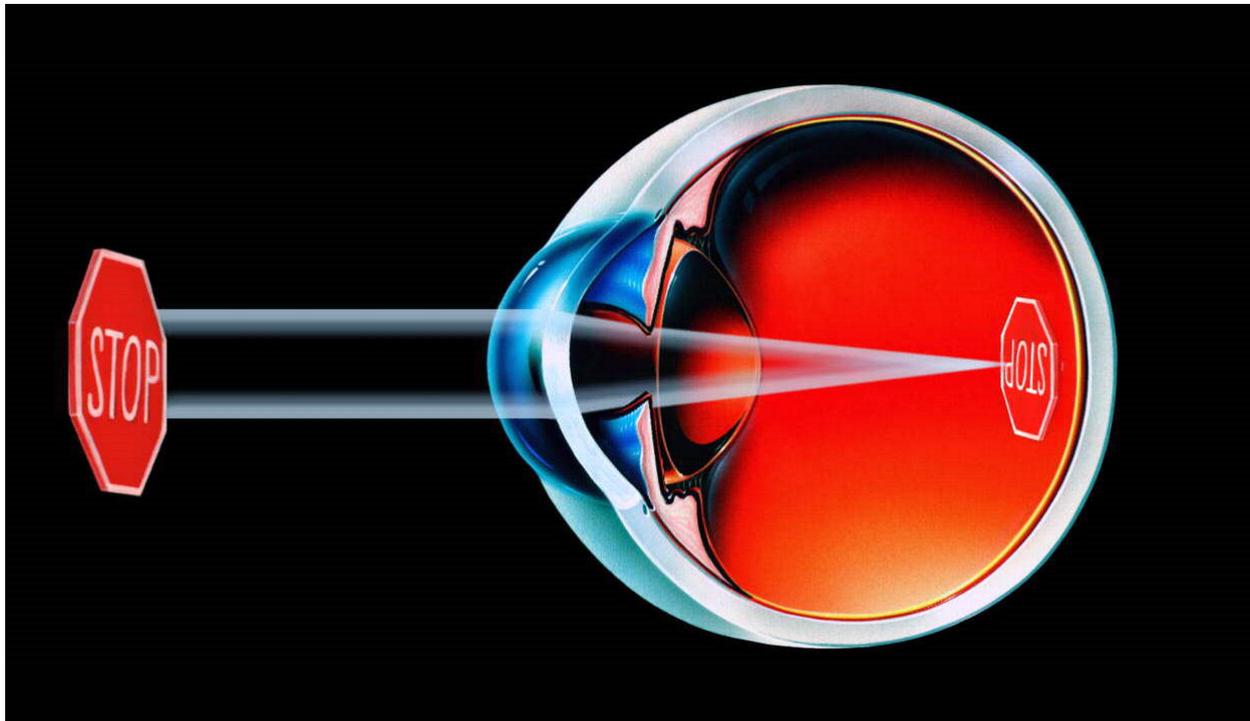
- Eyeglasses
- Contact Lenses
- Refractive Surgery



(taskandpurpose.com, n.d.)

# What is Refractive Surgery??

- Any surgery that changes the focal point of the eye.



(Gordon S.F., n.d.)

# Types of Refractive Surgery



- Radial Keratotomy (RK)
- Photorefractive Keratectomy (PRK) \*
- Laser Assisted in-situ Keratomileusis (LASIK)
- Small Incision Lenticular Extraction (SMILE)
- Phakic intra-ocular lenses (ICL)
- Intrastromal Corneal Ring Segments (Intacs)
- Laser Thermal Keratoplasty (LTK) or Conductive Keratoplasty (CK)
- Lensectomy/cataract extraction

\* most common refractive surgery in the military

# Photorefractive Keratectomy (PRK)

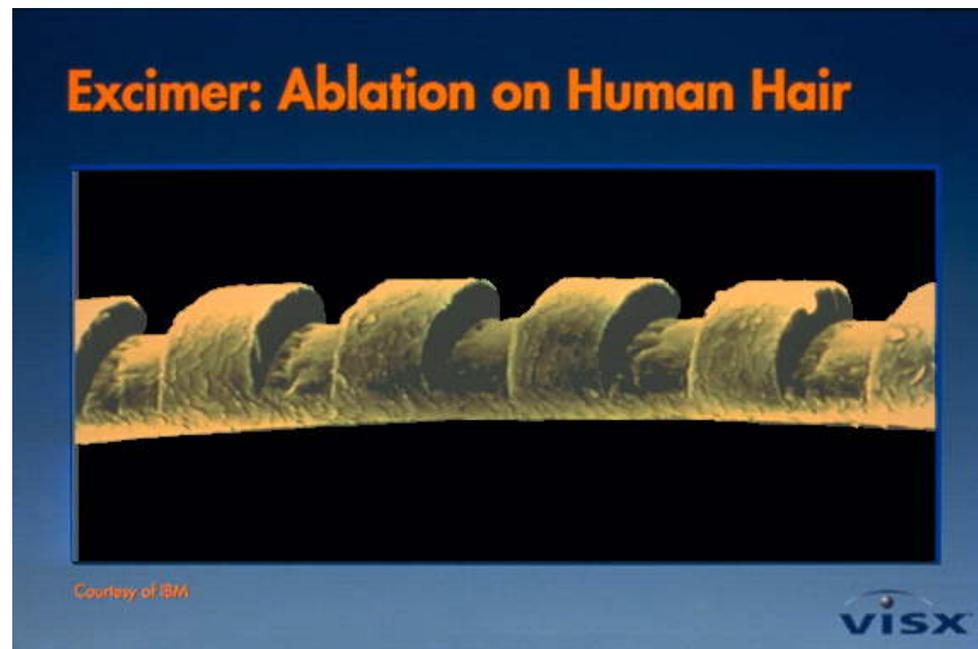
- Remove corneal epithelium [Brush or Ethanol alcohol (EtOH) well]
- EXCIMER laser reshapes the cornea
- Place a bandage contact lens
  
- Post-op discomfort
- Slow recovery
- Risk of corneal haze
  - \*\* Need sunglasses post-op for up to one year \*\*



(aao.org,, n.d.)

# EXCIMER LASER (Photoablation)

- Excited Dimer
- Wavelength 193 nanometers

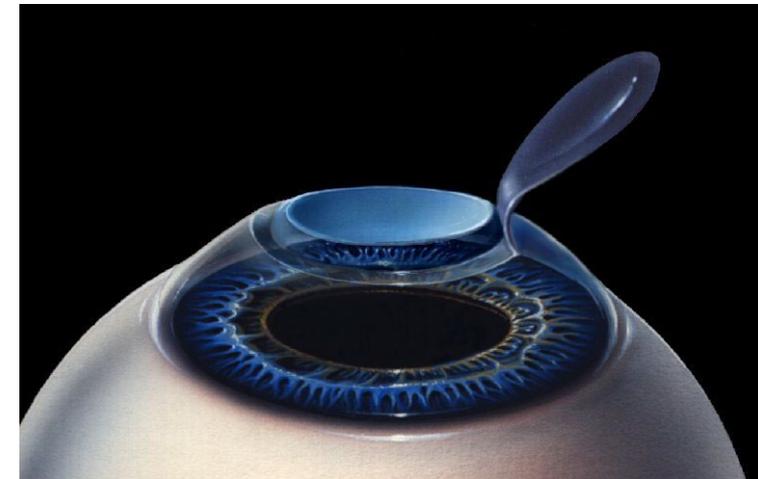


(ibm.com, n.d.)

# Laser Assisted in-situ Keratomileusis (LASIK)



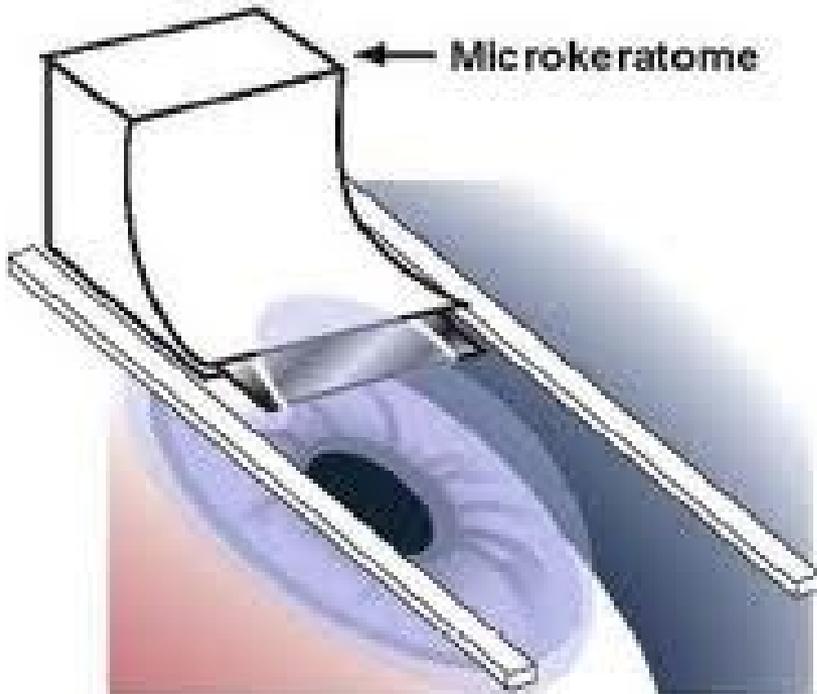
- Create a flap in the cornea with a femtosecond laser
- Lift the flap
- Reshape the cornea with the EXCIMER laser
- Reposition the flap
  
- Fast recovery
- No discomfort
- Immediate return to duty (RTD)
- Concerns for flap dislocation



(mayoclinic.org, n.d.)

# Femtosecond LASER

■ Wavelength 1053 nanometers



(lasereyecenter.com, n.d.)

# SMall Incision Lenticular Extraction (SMILE)

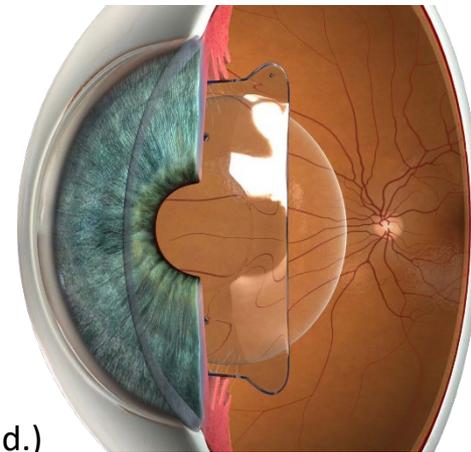
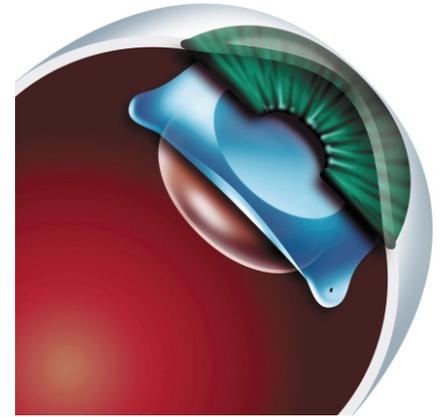
- Create a pocket of tissue “lenticule” with the femtosecond laser
- Dissect lenticule
- Remove lenticule
  
- Fast recovery
- No discomfort
- No flap dislocation



(allaboutvision.com, n.d.)

# Phakic Intraocular Lens (ICL)

- Completed in the Operating Room
- Full thickness incisions into the cornea
- Place ICL behind iris in front of the lens
  
- Fast recovery
- Higher reward with higher risks
- Cataract, glaucoma, endothelial loss



(centerforeyecare.com, n.d.)

# Current State of Refractive Surgery in the DOD

- Refractive surgery (RS) is ***performance-enhancing, readiness-enhancing,*** potentially ***life-saving*** in the operational environment
- Aviators with better uncorrected vision can detect adversaries earlier
- Glasses interfere with personal protective equipment, night vision goggles, head mounted displays
- Glasses reduce peripheral vision
- Glasses can be lost, broken, or confiscated.
- Contact lenses are not permitted in austere environments due to risk of serious infections



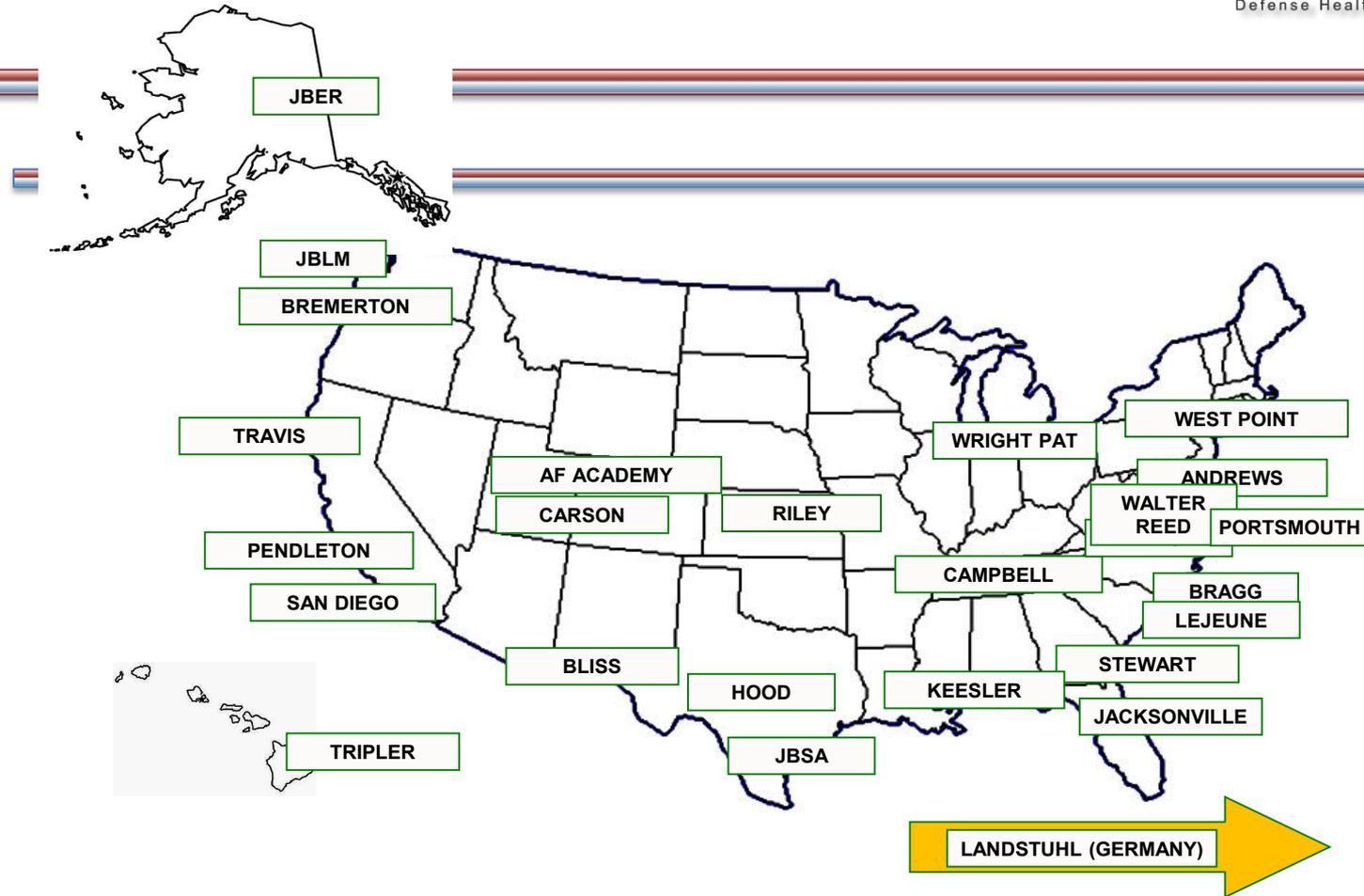
(alamy.com, n.d.)

# Current State of Refractive Surgery in the DOD



- Since 1993, research at military refractive centers has guided both clinical practice and military and civilian policy around the globe.
  - Perform unbiased evaluations of surgical technologies & techniques, and peri-operative medications, tests & equipment
    - Emphasizing maximum safety in a military setting
    - Pursuing maximum efficacy: “Super vision” (20/12 or better)
  - Assess operational impact of refractive surgery
  - Standardize and streamline equipment, techniques, and policies across the Department of Defense through frequent collaboration
  - Focus on safety, quality, and high reliability
  - Provide comprehensive training to surgeons, optometrists, and technicians so that they can perform safe, state-of-the-art refractive surgery for warfighters across the DoD

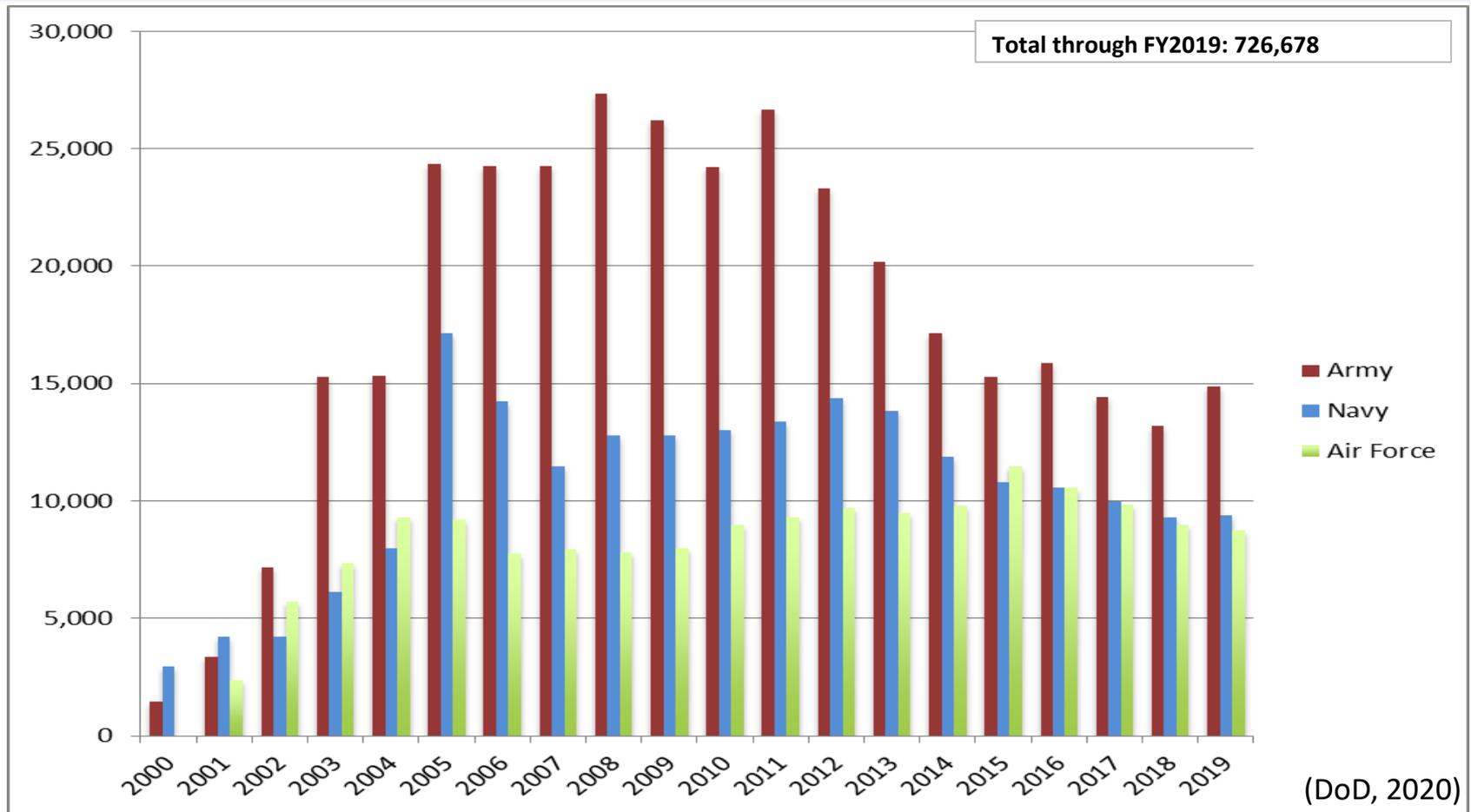
# DOD Warfighter Refractive Surgery Centers



(DoD, n.d.)

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# Refractive Surgery Procedures in the DoD since FY2000: PRK, LASIK, SMILE, and ICL



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# Who is eligible?



- Active Duty Service Members
  - Air Force/Army – 6 months left on active duty
  - Navy – 1 year left on active duty
  
- Stable refraction (no changes in at least 1 year)
  
- Healthy eyes (no active eye diseases or contraindications for refractive procedures)

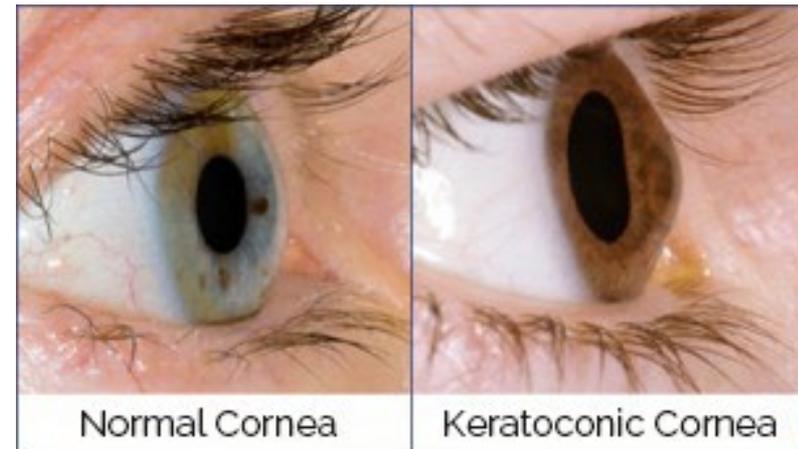
# It's not for everyone



- Cornea is too thin
- Corneal topography is abnormal – concern for ectasia after surgery
- Refractive error outside range of laser
- Unstable refractive error
- Dry eyes, corneal scars, or other ocular pathology
- Active systemic diseases (auto-immune, diabetes)
- Pregnancy/breast feeding

# Keratoconus

- Non-inflammatory
- Progressive thinning of the cornea
- 1 in 750 Americans
- Worse with refractive surgery
- Treatment:  
Corneal cross-linking



(clevelandeyeclinic.com, n.d.)

# Refractive Surgery in the DHA



- Established the Refractive Surgery Board (RSB)
- Standardizing policy, procedures, and guidelines



Photo credit: Legault, 2021

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# Refractive Surgery in the DHA



- Sign up now!!
- Gary Legault (RSB Chair) – [gary.l.legault.mil@mail.mil](mailto:gary.l.legault.mil@mail.mil)
- Brad Martinez (Program Manager) – [Bradley.o.martinez2.civ@mail.mil](mailto:Bradley.o.martinez2.civ@mail.mil)

# Key Takeaways



- Refractive error is prevalent and there are several different types: myopia, hyperopia, astigmatism, and presbyopia.
- There are various refractive surgery procedures performed in the military, most commonly PRK, LASIK, SMILE, ICLs.
- Refractive surgery enhances readiness and is not just another elective procedure.
- Refractive surgery is a benefit for active duty service members but not everyone is a great candidate.

# References



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<https://www.hsrd.research.va.gov/publications/esp/intraocular.pdf>

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Questions?

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To receive CE/CME credit, you must register by 0850 ET on 29 October 2021 to qualify for the receipt of CE/CME credit or certificate of attendance. You must complete the program posttest and evaluation before collecting your certificate. The posttest and evaluation will be available through 11 November 2021 at 2359 ET. Please complete the following steps to obtain CE/CME credit:

1. Go to URL: <https://www.dhaj7-cepo.com/content/oct-2021-ccss-promising-practices-military-health-care>
2. Search for your course using the **Catalog**, **Calendar**, or **Find a course** search tool.
3. Click on the REGISTER/TAKE COURSE tab.
  - a. If you have previously used the CEPO CMS, click login.
  - b. If you have not previously used the CEPO CMS click register to create a new account.
4. Follow the onscreen prompts to complete the post-activity assessments:
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  - b. Complete the Evaluation
  - c. Take the Posttest
5. After completing the posttest at 80% or above, your certificate will be available for print or download.
6. You can return to the site at any time in the future to print your certificate and transcripts at: <https://www.dhaj7-cepo.com/>
7. If you require further support, please contact us at: [dha.ncr.j7.mbx.cepo-cms-support@mail.mil](mailto:dha.ncr.j7.mbx.cepo-cms-support@mail.mil)